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COMING in *February* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- Many new techniques have supplemented and occasionally replaced older methods in the diagnosis of pulmonary disease. In the past, disease could be detected only after the major pulmonary lobes had become involved. Secondary and sometimes tertiary bronchi are now within diagnostic range, and detection of disease in these areas often constitutes a diagnostic triumph. Jerome A. Hilger, M.D., of St. Paul, Minnesota, outlines a plan of diagnosis in "Bronchologic Methods in Pulmonary Diagnosis" which places in orderly sequence and proper relationship both the new procedures in use today and the old methods which still remain the basic requisites of pulmonary diagnosis.

- In spite of the fact that injuries in the region of the knee carry a tremendous potential for further difficulty and require careful evaluation and acute judgment, remarkable functional recovery occurs more often in lesions of the knee joint than in any other severely injured joint. "Fractures in the Region of the Knee" by Edward J. Evans, clinical associate professor of orthopedics at the University of Minnesota, includes discussions on various types of patellar fractures and injuries of the tibial plateau. The importance of conservative treatment for nearly all knee injuries is stressed.

- Data on 35 patients hospitalized with infectious mononucleosis and the results of treatment they received are presented in the article "ACTH, Tetracycline, and Tetracycline Combined with Cortisone in the Treatment of Infectious Mononucleosis" by G. A. Cronk, M.D., and D. E. Naumann, M.D., of Syracuse, New York. Cortisone-tetracycline therapy apparently was of value, but should be confined to cases in which vital processes or nutrition may be seriously impaired.

- Tumors of the renal pelvis comprise 10 to 15 per cent of all renal tumors and affect men 3 times as often as women. In *LANCET Clinical Reviews*, M. P. Reiser, M.D., and C. D. Creevy, M.D., of the division of urology in the department of surgery at the University of Minnesota, report the case of a patient with "Carcinoma of the Renal Pelvis." Papillary tumors of the renal pelvis tend to grow slowly and often involve the ureter and liver. Careful cystoscopic examination and good radiographic delineation of the kidneys and ureters are essential. Since these tumors are radioresistant, surgical removal is the only curative treatment.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA POSTGRADUATE COURSES

A course in Neurology will be presented February 6 to 10. Intended primarily for the general practitioner, the course will also appeal to neurologists and neurosurgeons. Neurologic signs and symptoms most often encountered will be stressed. The course will be presented under direction of Dr. A. B. Baker, professor and director, Division of Neurology, and Dr. William T. Peyton, professor and director, Division of Neurosurgery.

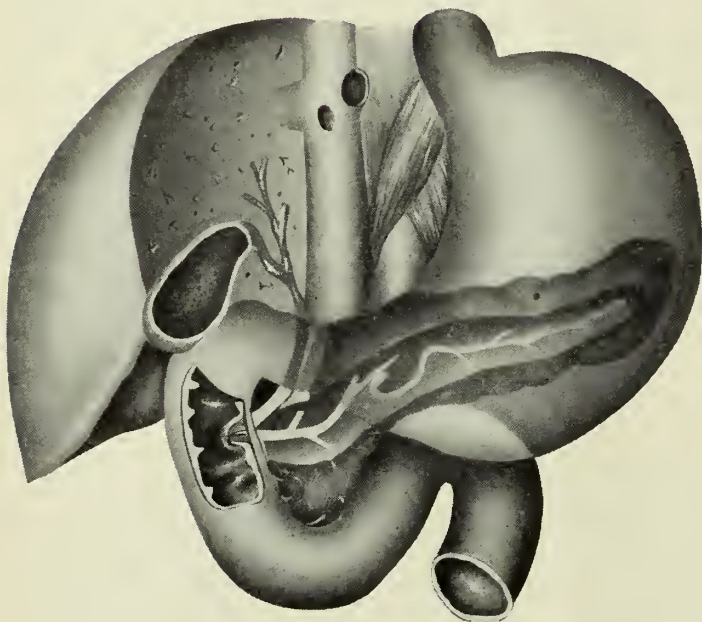
A course in Recent Advances in Internal Medicine for Internists will be held February 13 to 15. The program will stress recent advances in endocrinology and metabolism, renal disease, and cardiology. Guest speaker will be Dr. Joseph W. Jailer, associate professor, Department of Medicine, College of Physicians and Surgeons, Columbia University. Dr. Jailer will also give the Minnesota Pathological Society Lecture on February 14. The course will be presented under direction of Dr. C. J. Watson, professor and head, Department of Medicine.

A course in Cancer Detection for General Physicians will be presented February 16 to 18. Emphasis will be placed on cancer technics which can be used effectively in general practice. The course will be presented under direction of Dr. O. H. Wangenstein, professor and chairman, Department of Surgery, and Dr. W. A. Sullivan, director, Cancer Detection Center.

A course in Eye, Ear, Nose, and Throat for General Physicians will be given February 27 to 29. The problems most often encountered in this field will be discussed and treatment stressed. The course will be presented under direction of Dr. L. R. Boies, clinical professor and head, Department of Otolaryngology, and Dr. Erling W. Hansen, clinical professor and head, Department of Ophthalmology.

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Hydrocephalus: A Twenty-Year Survey of Hydrocephalic Births

EDWARD A. BANNER, M.D.

Rochester, Minnesota

ALTHOUGH HYDROCEPHALUS is not a common entity, the condition occurs just often enough to cause serious embarrassment to the obstetrician and occasionally causes morbidity and mortality for his patient. Many times its insidious nature lures the physician ultimately into complacency and serious complications develop. Therefore, those of us dealing with obstetrics must become thoroughly familiar with all of its manifestations.

Since few have had the opportunity of seeing many of these abnormalities, a study of the condition over a prolonged period seemed propitious, making careful note relative to its incidence, diagnosis, and, last of all, its therapy. Throughout the United States, congenital malformations have become one of the leading causes of death among infants, due to the rapid decline in the number of deaths from infections and the increased number of live births. In the state of Minnesota, congenital malformations recently assumed tenth place among the principal causes of death.

Since lesions of the central nervous system predominate as the major congenital malformation causing the most deaths, my colleagues and I decided to study the commonest manifestation,

namely, hydrocephalus. In January 1952, Dr. Crenshaw and I reported a series of such cases dating from 1935 to 1949. Today I shall give you an analysis of the complete statistics for the Mayo Clinic over a twenty-year period, from January 1935 through December 1954. During this period, more than 750 children born elsewhere, who had congenital hydrocephalus, later became patients at the clinic.

DEFINITION

Hydrocephalus is characterized by the presence of an excessive amount of cerebrospinal fluid within the cranial cavity. It frequently develops in fetal life or shortly after birth; the head often becomes enormously enlarged. In external hydrocephalus, the fluid occurs between the dura and the brain and this condition is considered rare. In internal hydrocephalus, the fluid is between the arachnoid and pia, the subarachnoid space, which includes the ventricular system of the brain. The cerebrospinal fluid is secreted into the ventricles of the brain by the choroid plexus in the lateral ventricles and in the third ventricle. The fluid passes through the sylvian aqueduct into the fourth ventricle and thence through the foramina of Luschka and Magendie into the large subarachnoid cisternae

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Read at the meeting of the North Dakota Society of Obstetrics and Gynecology, Jamestown, North Dakota, September 16, 1955.

over the base of the brain. From this area, it passes over the lateral surface of the brain and into the spinal canal. It is absorbed into the veins from all parts of the subarachnoid space. Under normal conditions, a large part of the reabsorption takes place through the pacchionian bodies, which are villous projections into the venous sinuses.

REVIEW OF THE LITERATURE

Recently Feeney and Barry¹ collected all of the records of hydrocephalic births during a twenty-year period of the Coombe Lying-in and National Maternity hospitals in Dublin. They reported an incidence of 2.5 per 1,000 deliveries. In their series, 9 maternal deaths occurred, which represented a maternal mortality rate of 3 per cent. They emphasized the fact that the diagnosis of hydrocephalus is not always easy and is not merely a matter of laying one's hands on the pregnant abdomen and feeling the grossly enlarged fetal head. They concluded that diagnosis by vaginal and roentgenologic examination may be extremely difficult.

In a study of the causes of stillbirth in a group of 17,500 births, Potter and Adair² found malformation accounted for 10 per cent of the total, placing it third among the causes given. They also found that malformation accounted for 2.5 deaths per 1,000 live births over a five months' gestation in fifteen years at the Chicago Lying-in Hospital. Next to pulmonary pathologic conditions, this was the cause of most fetal deaths.

Murphy's³ excellent work showed that lesions of the central nervous system were a most prevalent malformation and that hydrocephalus was the most common type. In 40 per cent of the cases of defect of the central nervous system, hydrocephalus was present; 32 per cent had hydrocephalus only; and 8 per cent had spina bifida in addition. Murphy stated that in those cases of hydrocephalus only, the proportion of males to females was 170:100. A most interesting relation revealed by Murphy, and one in which my colleagues and I concur, is the repeated occurrence of congenital malformations in a family after one such abnormality. After a couple had had a congenital or defective infant, the probability was 24 times greater than normal that a similar defective infant would be born to the family subsequently. Murphy also stressed several generalizations which he considered relative to defective childbearing. He concluded that children born late in the family are malformed more often than others. Among malformed fetuses, 4 times the normal incidence of premature births occurred. Miscarriage, still-

birth, or premature birth was more common either immediately before or after birth of a defective infant. Most frequently the mothers with malformed fetuses, according to Murphy, noted polyhydramnion and decreased fetal activity, and 11 per cent of them suspected a defective child because of abnormal fetal activity. Labors which were complicated by the fetal abnormality itself occurred in 27 per cent.

Grant,⁴ of Philadelphia, proposed the idea that perhaps all hydrocephalus associated with spina bifida is the result of infection.

Penfield⁵ was convinced that a block is always present somewhere in the system, although the location and completeness vary. He noted that the pronounced ventricular dilatation caused the white matter of the brain to suffer first, and the essential functions, therefore, were affected last.

Shapiro and Tosti⁶ found that hydrocephalus often was present in cases of spina bifida before it was evident externally, and often the condition became apparent only with growth and development of the infant.

DeLee and Greenhill⁷ noted that "the diagnosis of hydrocephalus would be made easily when the vertex presented, if it was kept in mind." In nearly all cases in which diagnosis was made prior to actual delivery, roentgenograms, they believed, are an important confirmatory or diagnostic aid.

Titus⁸ viewed with alarm the presence of hydrocephalic infants and stated that "only small or macerated hydrocephalics delivered spontaneously," and, thus, it behooved the obstetrician to become thoroughly familiar with all of the manifestations of hydrocephalus.

Moore⁹ published an excellent article on the moral aspects of therapeutic abortion, including craniotomy, in the treatment of hydrocephalus. He believed that the act of puncturing the ventricles in a living fetus is a justifiable procedure to facilitate delivery, but took issue with the common recommendation that steps be taken at the same time to insure brain destruction sufficient to cause death of the fetus.

O'Connor and Gorman¹⁰ stated that intraventricular tap and drainage by way of the vagina is the simplest and safest step when the vertex presents. They did not feel it necessary to wait for complete cervical dilatation, as is suggested in many current obstetric textbooks, but recommended that tapping be performed as soon as feasible.

Recently Bradley¹¹ suggested the use of a small catheter threaded into the spinal canal when the infant presents by breech. In his single case, the aftercoming head was too large to en-

gage in the pelvis, and, thus, the conventional manner of perforating the aftercoming head was impossible. The impasse was overcome by passing a cannula up the spinal canal to the cranial cavity. The task was made easier by the presence of spina bifida, so that it was not necessary to cut down on the vertebral column.

Wilder and Moldavsky¹² in a recent series did not experience difficulty with malformed infants except those having advanced hydrocephalus. They found hydrocephalus to be the third most frequent cause of uterine rupture and accompanied often by postpartum hemorrhage.

INCIDENCE

From January 1935 through December 1954, there were 36 hydrocephalic births at the Mayo Clinic. This number included only those infants in whom the diagnosis was evident during pregnancy, labor, or shortly thereafter. During the same period, approximately 20,400 live births occurred, representing an incidence of approximately 0.2 per cent. The recorded incidence of the United States varies greatly, ranging from 0.1 per cent to 0.2 per cent. The ratio of males to females was 20:16. There were 5 sets of twins. None of the siblings of the twin pregnancies was affected with hydrocephalus. A prenatal diagnosis of hydrocephalus was possible roentgenographically in only 1 of the twin pregnancies. Of the twins, 3 pairs were heterozygous and 2 were monozygous, according to the formation of the secundines. As previously reported, the incidence of congenital abnormalities increased in subsequent siblings after the birth of 1 abnormal infant. The maternal follow-up of the 36 births herein reported revealed 2 hydrocephalic infants delivered elsewhere, 2 spontaneous abortions, 1 missed abortion, and 1 stillborn at term with multiple congenital abnormalities. Congenital abnormalities compatible with life were present in 2 other infants. There were 5 normal births. In 45 pregnancies, anomalies were not present prior to the first hydrocephalic birth. In 4 instances, the histories were inadequate on this point.

The frequent occurrence of twins in our series certainly raises a point relative to diagnosing hydrocephalus in the presence of polyhydramnion or excessive uterine enlargement. In only 1 instance in 5 were roentgenograms helpful in making or suspecting a predelivery diagnosis. As often as not, the abdomen is unusually large and abdominal roentgenograms are taken at an early date as twins are anticipated. If the obstetrician's assumption is correct at this early stage of gestation, hydrocephalus of a minimum

degree many times is not diagnostic even though suspected. Under such conditions, additional roentgenograms, preferably correlated with pelvimetry taken during the third trimester, might be most helpful in diagnosing hydrocephalus.

PRENATAL COURSE

In 12 of 36 patients, the prenatal course was uneventful. The remaining 24 patients presented varied symptoms, none of which could be definitely correlated with the neurologic disorder. The maternal complications included vaginal spotting during the early months of the gestation, puerperal edema, mild toxemia, and occasionally excessive gain of weight. In 6 of the 36 patients, hydramnion developed which was excessive and which called attention to the abnormality. Abnormal fetal movement did not present as a diagnostic sign in our series, and no abnormal fetal heart tones were recorded as described by previous authors. The prenatal course of 3 patients referred to the clinic in active labor was unknown.

My colleagues and I agreed with other authors that hydramnion, either acute or gradual, was probably the only important single symptom of hydrocephalus in utero. In addition, vaginal bleeding, either early or late in the course of the pregnancy, was common, although none of the patients showed placenta previa or premature placental separation. The speculation might even be made that bleeding in the first trimester was nature's attempt to solve the already difficult problem.

MATERNAL AGE

The average maternal age in our series was 28 years, the youngest mother being 17 and the oldest 41 years of age. The average age of our patients was thus in agreement with that of the mothers in most series of congenitally defective births. The age at which to expect hydrocephalus is in the late twenties or early thirties. There were 24 multigravidas, 11 primigravidas, and 1 of unknown parity.

DIAGNOSIS

The diagnosis of hydrocephalus was made during prenatal care in 15 of the 36 cases, during labor and delivery in 18, and in the remainder the diagnosis was made immediately postpartum. All those missed during their prenatal course and at delivery were of a slight degree of hydrocephalus. In those who survived, hydrocephalus became more evident with time. The increased diagnostic acumen of the roentgenologist is noted in an analysis of our previously reported 24 cases

which included all those up to 1949. During this period, the roentgenologic examination proved to be of value in only 3 cases. In other words, in 3 cases the diagnosis was made by the roentgenologist at the time of roentgenographic examination and prior to clinical awareness. The roentgenographic examination was found to be positive in 8 of the additional 12 cases which are herein reported.

Parenthetically it may be said that hydrocephalus of a minimum or moderate degree is not easily diagnosed, and, even though suspected, the condition is not easily confirmed. Perhaps the most reliable method of diagnosis under such conditions is the combined abdominovaginal examination correlated with the roentgenologic diagnosis. Obviously the final diagnosis can be made and confirmed only when the association between the obstetrician and the roentgenologist is close; the awareness of the possibility of hydrocephalus is entertained; and a complete set of minimally distorted roentgenograms, preferably pelvimetry, to the utmost degree of perfection is obtained. Otherwise, although diagnosis often is made early, many hydrocephalic infants present themselves to the embarrassment of the obstetrician as a cause of prolonged labor, dystocia, and maternal morbidity or even maternal mortality.

LENGTH OF GESTATION

In 8 of the 36 cases herein reported, the labor was premature, while in the remaining 28 the mother entered labor at term. Our impression was that the spontaneous onset of labor offered the most favorable prognosis to the mother. In vertex presentation, perforation of the ventricles can be accomplished through a fontanel or suture line. The insertion of a spinal needle or any large-bore needle through the fontanel is usually very easily done. Gratifying to note is the rapidity with which some of these large heads drop into the pelvis after the fluid has been evacuated. Evacuation of the head should take place as soon as it can be reached with the instruments available, whether they be long scissors, a spinal needle, or a large-bore needle. Since, theoretically, these large hydrocephalic heads might rupture the lower uterine segment, this operation is best performed at as early a time in labor as is feasible. Craniotomy prevents injury of the lower uterine segment and also hastens labor. In some cases of vertex presentation, the application of Willett forceps or tenaculum to the scalp and the exertion of judicious traction during uterine contractions assist delivery. It might be stated parenthetically that the amniotic fluid

should be drained from the uterine cavity slowly, since abruptio placentae has resulted from rapid collapse of these enlarged uterine cavities, thereby increasing maternal risk and occasionally causing serious maternal hemorrhage. In breech presentation, the evacuation of the large hydrocephalic head may be accomplished through a meningocele of the infant or through a point behind the ear or under the skin of the neck beneath the occipital plate of the aftercoming head by puncture with a large-bore needle. Should the aftercoming head remain high in the abdomen, a catheter threaded through the spinal canal to the cranial cavity might be necessary. Should, as in Bradley's case, spina bifida be present, the insertion of such a catheter is made easy. Extreme care should always be taken in delivering these large collapsed heads, with sometimes very large bony spicules protruding through the scalp, lest injury occur to the lower uterine segment or vagina. Cases have been noted in which the bony spicules have perforated arteries or veins, causing serious hemorrhage.

DELIVERY

The deliveries were noted to be "difficult" in 12 of the 36 cases herein presented, and 2 of these were by version and extraction. Dührssen's incisions were made in 1 patient and yet, in another, the uterus had to be packed with iodoform gauze as prophylaxis against postpartum hemorrhage. Secundines were delivered intact in all of the patients, except 1 in which a manual removal of the placenta was necessary. More than one-third of the deliveries were technically difficult, and these included many cases in which craniotomy had been performed. Whether these were because of poor collapse of the fetal skull is impossible to state, but the fact does reveal that tapping of the fetal skull is not always the complete answer to the handling of a hydrocephalic infant. In 2 cases, the large skull had to be aspirated repeatedly. With aspiration, occasionally portions of brain tissue have been noted to clog the needle, making evacuation difficult. In these cases, the needle must be reintroduced in various areas, thereby assuring complete or almost complete collapse of the fetal skull.

Of the 36 cases herein presented, 27 were vertex presentations, 7 breech presentations, and 2 transverse presentations. From these figures, hydrocephalus did not appear to greatly affect the polarity of the fetus. More than half of the deliveries were spontaneous, but craniotomy had been performed in 50 per cent prior to delivery. In the other patients, delivery often needed as-

sistance, although the skull was collapsed. Most of the obstetricians favored obstetric forceps rather than the bulky cranioclast. In others, an Allis forceps or Willett forceps was used to assist delivery.

We could see no point in version and extraction because of hydrocephalus alone, and the possibility of uterine rupture is always present with any added strain on what is already an over-stretched lower uterine segment. Perforation of the skull is, if anything, more easily done with the vertex presenting.

Cesarean sections were necessary in 3 instances. In 1 patient, a cesarean section was necessary because of a leaking cerebral aneurysm. The neurologist felt that labor would probably cause further cerebral hemorrhage and possibly maternal death. In the second patient, cesarean section was necessary because of the transverse presentation and an enormously large fetal head. This diagnosis was made preoperatively and although morcellation was considered, it was believed that the infant could better be removed by cesarean section. Although this was done, it was necessary to trocar the fetal head before delivery could be made through the uterine incision. Maternal morbidity did not occur postoperatively. The third cesarean section was necessary after a prolonged labor of sixty hours in which the fetal head had been aspirated 3 times. Various forceps were tried in an attempt to bring the head down into the pelvis, but this was found impossible. After the development of a contraction ring in the uterus, a 17-year-old mother was delivered of a stillborn infant by cesarean section. The infant had spina bifida as well as hydrocephalus. No maternal morbidity was noted.

Difficulty is not ordinarily encountered in locating the dilated ventricles, but attempts to destroy the brain stem should be postponed until after drainage has been done or the soft mushy tissue may clog the needle or trocar, seriously interfering with the main purpose of the operation. Occasionally this occurs in spite of all precautions and a hemostat, craniotribe, or cranioclast may be necessary to insure adequate drainage.

THE INFANT

Of the 36 infants in our series, 13 were born alive and 23 were stillborn. Of the 13 born alive, 5 still survived according to our latest record. The majority of deaths after a live birth occurred within twelve hours.

More than half of the hydrocephalic infants had other gross defects, which is a well-known

and important factor in relation to this disease. When a diagnosis of some other congenital defect is made from prenatal roentgenograms or at breech delivery, hydrocephalus always must be considered and, if possible, ruled out. Necropsy revealed spina bifida in more than three-fourths of the cases, but there is still much argument about its possible role in the development of hydrocephalus. Among the abnormalities of the central nervous system which were disclosed at necropsy and which were possible contributory factors were the following: spina bifida, stenosis of the aqueduct of Sylvius, meningitis, and hydromyelia of the spinal cord. Other malformations of the spinal cord were noted in 4 children and defects of the cerebellum in 2. A cerebellar cyst was noted in 1 infant and club-foot as well as other defects were listed in 18 infants.

POSTPARTUM COURSE

The postpartum course of 20 of the 36 mothers was uneventful. The average duration of hospitalization of these 20 mothers was nine days. The remaining mothers showed signs of morbidity and most of them underwent prolongation of their hospitalization. There was 1 maternal death. The patient died on the second postpartum day as the result of metastatic carcinoma of the rectum.

The increased rate of morbidity that is expected with the operative procedures and abnormal labors involved in delivery of a hydrocephalic infant has shown a considerable drop since the advent of antibiotics and can doubtless be reduced still further with more frequent early diagnosis. This decrease is evident in a review of our first 24 cases in which we reported a morbidity of 6 of the 24 mothers therein presented. In an analysis of our last 12 cases, no maternal morbidity nor mortality occurred.

SUMMARY AND CONCLUSIONS

In recent years, congenital malformations have been the predominant cause of death of the newborn and of the stillborn. Hydrocephalus is foremost among malformations of the central nervous system.

We have reviewed the records of 36 hydrocephalic births at the Mayo Clinic which occurred in a twenty-year period. The incidence of hydrocephalic to total births was approximately 0.2 per cent.

Hydrocephalic births are more common in families presenting a past history of congenital malformation than in other families. The cause is to a large extent undetermined.

The diagnosis of hydrocephalus is frequently missed before term; perhaps more reliance can be placed on thorough roentgenologic study whenever this condition is suspected during the prenatal period. Hydrocephalus of a moderate degree is particularly difficult to diagnose.

Male infants are slightly more prone to develop hydrocephalus than female infants. Although in 5 cases the hydrocephalic infant was a member of a pair of twins, in no case was the other twin affected by congenital malformations.

Hydramnion was the most frequent prenatal manifestation and was present in one-fifth of the cases. Pregnant women in the latter twenties and early thirties are most prone to bear children with congenital malformations, and, in general,

the length of their labor may be found to be excessive.

More than one-third of the deliveries may be technically difficult in spite of craniotomy. Hydrocephalus does not influence the polarity of the fetus.

The survival rate of hydrocephalic babies who are born alive is extremely low, and the control of their future medical course is occasionally unsatisfactory.

Spina bifida, stenosis of the aqueduct of Sylvius, and meningitis are the 3 most common accompanying postmortem findings. The incidence of noncontributory malformations is high, occurring most frequently in the genitourinary tract.

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GYNECOGRAPHIC examination is often successful when other methods of diagnosis are difficult or inconclusive for cases of infertility; for diagnosis of ovarian or uterine anomalies; and for establishment of the existence of internal female genitals in pseudohermaphroditism. Herman A. Strauss, M.D., and Melvin R. Cohen, M.D., Michael Reese Hospital, Chicago, obtain excellent results by utilizing standard equipment and simple positioning.

The patient is prepared by lower bowel and bladder evacuation and sedation. Gas is introduced into the peritoneal cavity to displace the bowel and silhouette the pelvic organs. Transabdominal rather than transuterine pneumoperitoneum is recommended. The patient is placed in the dorsal position with the hips elevated on a 4-in. thick pad. Approximately 1,000 cc. of carbon dioxide is injected through the skin, fascia and muscle, and peritoneum, using a No. 18 spinal needle inserted 1 in. below the umbilicus and 1 in. to the left of the midline. Pressure during injection should not exceed 40 mm. of mercury. The patient is turned to the prone position, with the buttocks elevated by a 4-in. pad under the lower abdomen and with the back arched. The head of the table is canted down 15°. The roentgen ray is directed between the coccyx and symphysis pubis.

A roentgenogram is made after pneumoperitoneum with the patient in modified knee-chest position. Through an intrauterine cannula, 4 cc. of iodized oil is injected, and a second film is made with the patient in the prone position. A twenty-four-hour control film may also be made to establish patency of the tubes.

Pneumoperitoneum should not be done when shock or acute pelvic inflammation is apparent or when large lesions interfere with visualization.

HERMAN A. STRAUSS, and MELVIN R. COHEN: *Am. J. Obst. & Gynec.* 70:572-581, 1955.

Treating Insomnia with Doriden, A New Nonbarbiturate Sedative

DANIEL T. WESTON, M.D.

Santa Monica, California

INNUMERABLE AGENTS are employed for inducing sleep. The majority, however, are habit-forming barbiturates which cause hangover, are poorly tolerated, or are contraindicated in some instances. Any new drug for insomnia which might be safer and as effective is well worth clinical study.

Recently we were introduced to Doriden, a nonbarbiturate sedative and mild-acting hypnotic which appeared to have quieting and sleep-producing properties without the usual side effects.

Pharmacologic studies showed that Doriden was an effective somnifacient and anticonvulsive which was relatively nontoxic. Chemically it is alpha-ethyl-alpha-phenyl-glutarimide. Non-narcotic Doriden is also chemically different from chloral hydrate, bromides, and paraldehyde.

Clinical studies revealed that Doriden was well tolerated by patients of all ages and in a wide range of diseases. The drug had been used safely in the elderly, in neuropsychiatric patients, in persons with some forms of epilepsy such as petit mal, and in patients with cardiovascular disease when some sedatives are poorly tolerated or contraindicated.

In both animal and clinical studies, Doriden in therapeutic dosage did not cause respiratory depression nor alter blood pressure or pulse rate. Investigators also reported that Doriden in recommended dosage had no adverse effect on erythrocyte count, leukocyte count, hemoglobin, urine, or liver function after several months' trial.

Since a nonbarbiturate sedative and hypnotic would be an extremely valuable addition to our medical armamentarium, we decided to give Doriden a clinical trial at our hospital.

A total of 415 patients, consisting of 185 females and 230 males varying in age from 4 to

103 years, were treated with Doriden. The dosage ranged from 0.25 to 4 gm. daily.

Of these patients, 20 were hospitalized because of cardiac disease or orthopedic problems which, in turn, interfered with sleep. Another 160 aged patients were hospitalized because of senility and required sedation because of retrograde amnesia, belligerency, confusion, or paranoid delusions. The majority of the ambulatory patients, totaling 180, complained only of insomnia of nonspecific origin. Doriden was given to 55 intoxicants in amounts sufficient to cause sedation.

RESULTS			
SLEEP INDUCED FOR SIX TO EIGHT HOURS WITH DORIDEN			
	0.25 gm.	0.5 gm.	Total treated
Senile hospitalized	50	110	160
Medical hospitalized		20	20
Ambulatory hospitalized	95	85	180
Intoxicants hospitalized	35	20	55

In addition, 3 patients with petit mal were given 0.75 gm. of Doriden to control epileptic seizures. After 10 months, the number of seizures decreased from an average of 30 a week to 4. Seizures increased markedly when Doriden was withdrawn. As a result of treatment, these patients were able to return to work or school.

The incidence of side effects in this large group was remarkably low. A rash developed in 3 patients which disappeared although the drug was continued. No patients had to discontinue the drug entirely, and no habituation was observed. After taking 16 gm. of Doriden, 1 patient complained of nausea, but no evidence indicated that the drug was responsible.

CONCLUSIONS

Doriden was administered to 415 patients during a period of one year. The drug is a safe and effective hypnotic in doses ranging from 0.25 to 0.5 gm. and produces six to eight hours of sleep.

Doriden used in this study was supplied by Ciba Pharmaceutical Products, Inc., Summit, New Jersey.

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Involutional Psychotic Reactions

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INVOLUTIONAL PSYCHOTIC REACTIONS fall into two groups. The characteristic feature of one is depression and of the other, paranoid ideas.

These reactions account for the largest number of first admissions to mental hospitals exclusive of schizophrenic reactions and the chronic brain syndromes associated with senile brain diseases and cerebral arteriosclerosis.

The ratio is greater in women than men, 2 to 3 to 1, and occurs in the former during the fourth decade and in men during the fifth decade. During this involutional period, activity of the endocrine glands decreases with resultant changes in vegetative and metabolic activities of the body. An increased irritability of the sympathetic nervous system may occur with the cessation of ovarian activity and consequent changes in function of the rest of the endocrine system. Important as these physiologic changes are, their psychologic import may be more significant. The personality is threatened by the loss of the biologic function and the onset of "old age." The stresses and threats of the involutional period coming to an insecure personality may result in depression, agitation, and paranoid ideas. This is a period that such a person has often dreaded; a period when a feeling of more security is needed to weather the added stresses; and a period when all adjustments are hard to make. If life has not brought the success or fulfillment of long held desires, the individual realizes these cannot now be attained. This realization increases feelings of frustration and insecurity and contributes to depression. Retirement from business with the loss of the long held interest in one's work may result in depression.

A dreaded loneliness accompanied by loss of physical attractiveness and femininity may be contributing factors to depression in women as they grow older. Many women have set too high a value on their youth, beauty, and sex and find changing these values a difficult task. Rebellion toward aging, so commonly found,

may promote depression. In some women, hates and resentments may be repressed so fiercely during this period that they turn into self hate and depression. Many women have so devoted their lives to their children that they have neglected hobbies, outside activities, and other interests. They are then lost when the children leave home, feel neglected, and no longer essential. Death of friends at this time is often an added blow, suggesting thoughts of their own death with the associated apprehension.

With this precarious hold on life by the individual, it is understandable why any upsetting experience such as loss of position, of financial security, of a loved one upon whom one was dependent, or the breaking up of a home may prove catastrophic and precipitate psychosis with its apprehension, depression, ideas of death, nihilism, and hypochondriasis. With the decrease of physical vigor added to the stresses of the involutional period, a resurgence of unconscious conflicts occurs to threaten the individual. The formerly adequate reaction formations and compensations fail, thus intensifying the apprehension and tension.

A certain general type of prepsychotic personality is often found in the involutional psychotic depression reaction. Often a background of insecurity results in an anxious child who is inhibited, overly sensitive, too serious, quiet, inclined to worry, very honest, intolerant, and given to feelings of guilt. As she grows older, her moral code is strict, and she punishes herself without mercy for its violation because her personality is dominated by the super ego. Many have a great need for the approval of others. Many are overly dependent. Not a few have compulsive-obsessive trends. Some have repressed with difficulty aggressive and hostile impulses. Many authorities believe the involutional depressive prepsychotic personality develops as a reaction formation against these impulses.

Often a prodromal period of several weeks to months occurs before a typical involutional depression develops. This period may be char-

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Read at the regional meeting of The American College of Physicians, State Hospital, Jamestown, North Dakota, September 10, 1955.

acterized by somatic complaints, such as peculiar sensations in body, insomnia, and anorexia with weight loss; by mood change, including pessimism, slight depression and apprehension with crying spells, irritability, and peevishness; by lack of interest in former activities and work; and by groundless financial and other worries.

In the typical case of involutional depression, the prominent symptom is deep depression often accompanied with pronounced agitation, hypochondriasis, ideas of self-accusation, fears of an incurable disease, and thoughts of impending death.

The suffering and misery of these patients is intense. They pace restlessly back and forth unable to be quiet a minute. They wring their hands, may pound their heads and hands against the wall, and pick at their skin and nails, leaving sores. They often repeat such stereotyped phrases as, "I'm lost." "There is no forgiveness." "What's going to happen to me?" Many of them fear they are going to be killed in some cruel way, feel that such a death is deserved but plead for mercy. This shows their desire for both life and death.

The self-accusatory ideas and depression may be partially explained by feelings of guilt. Many individuals who have led exemplary lives begin to worry over youthful errors which were normally considered trifling and insignificant, but which later become magnified into the unpardonable sin. A woman who feels that her sexual forces are declining may rationalize her inner dissatisfactions as physical disease and thus come to believe that she has no blood, no stomach, no brain, that her bowels do not function, and so forth. Food is often refused because: (1) she does not want to live; (2) she believes she is not deserving of food; (3) she believes the food is poisoned; or (4) she has the nihilistic idea that since she has no stomach or intestines, the food does not have a place to go.

About 50 to 60 per cent of patients suffering from involutional psychotic depression respond well to electric convulsive therapy. The prognosis is better when the reaction is like the manic-depressive reaction. Pronounced hypochondriac ideas, absurd delusions, a large number of hallucinations, poverty of ideation, seclusiveness, petulance, and whining are unfavorable prognostic symptoms.

In differential diagnosis, the following conditions should be considered: manic-depressive psychosis, chronic brain syndrome with cerebral arteriosclerosis, and psychoneurosis with anxiety reactions. In the former, a history of previous periods of depression or excitement is found.

Patients with cerebral arteriosclerosis show easy mental fatigability, impaired comprehension and memory, and little initiative. Their fear is not as deep and is less well sustained than in those in a manic-depressive state. In anxiety reactions hallucinations, delusions, and real depression are not found. Paroxysms of fear do occur.

Hospitalization is very important because of frequent suicidal attempts and constant vigilance is necessary as a means of prevention. Many patients are in poor physical condition on admission because of restlessness, agitation, and poor appetites. They must often be fed intravenously or by gavage. The continuous tub is of value in quieting patients. Estrogens are used for vasomotor disturbances. Sedatives are employed briefly for control of insomnia and restlessness. E.C.T., preferably after narcosis by Sodium Amytal or Pentothal, should be instituted promptly. Many times improvement is noted after the first treatment. Most patients improve during the first five treatments and show a lessening of insomnia, agitation, and depression and restored appetite. An average of 6 to 10 treatments is required, but some patients may require many more. Thorazine is very effective in many cases of pronounced agitation and may take the place of E.C.T. Psychotherapy is very important in giving patients insight into factors contributing to their illness. Occupational and recreational therapy are valuable adjuncts. The following are reports of two patients with involutional psychotic depressive reactions.

CASE REPORTS

H. H., a 49-year-old white woman of German descent, married, and the mother of 6 children, a native and resident of North Dakota with a third-grade education, was admitted June 21, 1955, with a history of mental symptoms dating from March 21, 1955. Physician's returns stated that she felt no one cared for her, thought everyone was against her, blamed herself for everything going wrong on the farm, had threatened suicide, and was at times mute. On admission, she was very agitated, depressed, refused to eat, saying she couldn't eat and required gavage or spoon feeding. She slept poorly even with sedation. She said, "I'm always bad. I blame myself for what goes wrong at home." On June 24 she became very agitated. "They'll x-ray me. They all said the electric chair. I'd rather work from early morning until late at night than that." She stayed by herself and showed no interest in visiting with others or in being occupied. Often she tried all the doors in an attempt to leave the hospital ward. She made a suicidal attempt on June 26, but was found shortly after she had put her belt around her neck. On June 27, she thought all of her children had been mangled, and she had been put in the penitentiary. Thorazine was tried for one week, which may have been too short a time. The result was lessened agitation but deeper depression, so the drug was discontinued. E.C.T. was started on June 28, after Sodium Amytal was administered intravenously. On awak-

ening after several hours of sleep, she ate her first good meal since entering the hospital and commented that she couldn't understand why she had wanted to die. She continued to improve and E.C.T. was discontinued on July 18 after 8 treatments. Provisional discharge was granted on August 3.

A. V., a 51-year-old white widow, mother of 1 child, a native and resident of North Dakota with an eighth grade education, was admitted for the first time October 23, 1950. Before admission, she had talked of nonsensical things, cried readily, and wandered over to the neighbors at night. On admission, she was agitated, depressed, showed considerable pressure of thought, and moaned and groaned a great deal. She was fearful of what we might do to her and asked what we were putting over on her. She said, "Somebody is surely making a mess of something here. Somebody made a mistake. Somebody is trying to make money. God, help me." She responded well to E.C.T., receiving 12 treatments, and was provisionally discharged on December 9, 1950. She returned in an agitated and depressed state July 14, 1951, felt she had made many mistakes, and was on the witness stand. She again improved after E.C.T., receiving 22 treatments. She was provisionally discharged on November 24, 1951.

She was admitted on a second commitment June 15, 1955. Physician's returns stated that she had been acting queerly for six months, was agitated for three weeks, and had been hospitalized in a general hospital where she was alternately agitated and depressed. On this admission, she was agitated, depressed, fearful of harm, and kept asking, "What are you going to do to me?" She talked of guns, of her fear that children would be harmed by them. Appetite was poor and she did not

sleep well. On admission, she was given 25 mg. of Thorazine intramuscularly. This dose was repeated in an hour, then every four hours. Thorazine was increased daily by 25 mg. per dose until she was receiving 100 mg. every four hours. After the first few days, it was given orally. By June 23, she had shown pronounced improvement and was put on a Thorazine schedule four times a day. By June 29, her mental condition was good, she was no longer fearful, agitated, depressed, or delusional. Thorazine was gradually decreased and was finally discontinued on July 22. She was granted provisional discharge on August 6, 1955.

Patients with involuntional psychotic reactions with pronounced paranoid features have a poorer prognosis than those with predominating depressive features and E.C.T. is of limited benefit in such cases. These patients have felt insecure since childhood and certain character traits develop to overcome this feeling. They are hypercritical and blame others for their failures. They are overly sensitive, seeing slights when none are intended and nursing these grievances. They are unforgiving, resentful, suspicious, and secretive. Hostility and bitterness are often pronounced. With the stress of the involuntional period, the established defensive patterns prove inadequate and the more extreme patterns, well organized persecutory delusions, and misinterpretations of the paranoid psychosis are utilized.

ELECTROMYOGRAPHIC EXAMINATIONS prove an accurate guide to prognosis in Bell's palsy, according to D. Taverner, M.D., University of Leeds, England.

If needle electromyograms demonstrate fibrillation activity of facial muscles, denervation with incomplete return of motor function is expected. However, without fibrillation, complete recovery is predicted. Fibrillation can usually be detected by the seventh day.

A group of 100 patients with Bell's palsy was studied with aid of electromyography. Palsy was considered a result of an enigmatic intrinsic lesion of the seventh cranial nerve producing a sudden, partial to complete, unilateral paralysis of facial muscles without other evidence of central nervous system, ear, or posterior fossa disease.

Approximately one-half of the patients experienced auricular pain or disturbances of taste. Herpetic vesicles of the external auditory canal were not common. Of the group, 45 patients, 3 with total paralysis, had no fibrillation and recovered rapidly and completely within about fifty-one days. Of the 55 patients with fibrillation, 25 with complete paralysis, none recovered completely, although one-third noted approximately 75 per cent return of normal function.

Sequelae developed only in patients with fibrillation and included contracture formation, associated movements, spontaneous twitching, and paroxysmal lacrimation during mastication. Every patient had facial twitching synchronous with blinking or blink-bursts as recorded electromyographically. Associated movements and abnormal lacrimation were considered results of misdirected regenerating axones.

Definitive treatment is not available. Surgical decompression of the facial nerve in the fallopian canal is not justified.

D. TAVERNER: *Brain* 78:209-228, 1955.

Toward a Program of Preventive Mental Services

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OF ALL the medical specialists, the pediatrician has contributed most to the development of preventive health services. Through knowledge gained by diligent study of the infectious diseases, nutritional disorders, and processes of normal physical growth and development, effective measures have been instituted to protect and sustain the health of our children. As a result, children today are physically healthier than at any time known in history. While this is true of physical health, there is no indication that it is true of mental and emotional health. In fact, there are those who believe the opposite. Logically, therefore, the pediatrician, with others, has become increasingly interested not only in the promotion of a positive program of mental health but also in the prevention of maladjustment.

Every area of medical practice involves three interrelated components: (1) the diagnosis and treatment of the ill, (2) research to determine the pathogenesis of the illness and effect better treatment measures, and (3) the development of an effective program of prevention in the light of empiric and research experience. These basic components are present equally in the field of mental health. Here, too, prevention is the goal sought.

During the past several decades, emphasis in the field of mental health has been largely directed toward solving the problems of mental illness with minimal attention given to the field of prevention. A new orientation seems to be emerging wherein emphasis is placed on mental health rather than on mental illness. This point has been aptly expressed by Blain,¹ who stated: "Our attention is traditionally focused on the six per cent who are sick. It is the ninety-four per cent who are well who are the most important. Mental health is more important than mental disease. Viewed without sentiment, healthy people are more important than sick people. There are more of them. They do their share of the world's work, produce enough in excess of their own needs to provide for children and the aged; and they care for the sick. It is in

changing sick people into healthy people, and in keeping the healthy from getting sick, that medical science finds the chief reason for existence."

It is the purpose of this presentation to call attention to the great need to further develop a program of preventive mental health services; to consider what the physicians, particularly the pediatricians, might contribute to it; and to determine the areas in which to begin.

DEFINITION OF TERMS

It is well to define our terms. *Mental health* is a state or condition of mental well-being. Its basic ingredients are well defined by Preston,² who states: "Mental health consists of the ability to live: (1) within the limits imposed by bodily equipment, (2) with other human beings, (3) happily, (4) productively, and (5) without being a nuisance."

Implied, also, is the ability to meet "difference" successfully, not as something to be feared but as something which can stimulate further growth. Another component is the capacity to accept and discharge responsibility commensurate with endowment, training, and experience.

Some years ago, one of my colleagues gave me a definition of a "flexible person"³ which aptly expresses our goal: "The flexible person is one who respects himself but has no conceit, who has been guided by principle but who has not been the slave of dogma, who has had steadiness of purpose without being hypnotized by an inimitable goal, who has bent his energies to making the grade rather than getting to the top first, who has tolerated his weakness while employing his strengths, who has respected his neighbors as well as has had pride in himself."

Mental hygiene, on the other hand, is the process whereby mental health is achieved and maintained. Implied is a willingness to understand our own basic needs as well as the needs of others and to initiate and promote a program of action which will achieve the goal—mental health for ourselves and others.

Prevention exists in varying degrees. "Abso-

Read at the Pediatric Grand Reunion honoring Dr. Irvine McQuarrie on his 25th year of service to the University of Minnesota.

lute prevention" is the ideal, which, at present, is remote because of the lack of basic knowledge. However, two lines of endeavor are open to all interested in the field: (1) the amelioration of conditions regarded generally harmful to mental health and (2) early recognition of maladjustment and institution of corrective measures.

This can best be done by the physician, particularly the pediatrician, irrespective of specialty interest, who deals with children and their families.

BASIC NOTIONS

At the time of birth, each child comes into the world with a certain heritage and potential for growth. As with physical growth, the development of the personality is a reciprocal process of continuing differentiation as well as integration. Growth proceeds in an orderly sequence in a time relationship. While the rate of growth for the average child born into our culture has been determined, each child develops in accordance with his own pattern, with the tempo of growth in the important first years generally characterizing the pattern for subsequent development until the optimal potential has been realized. This is true unless extenuating circumstances tend to skew the development pattern.

From another point of view, growth is a continuous process of separation, with the child assuming greater responsibility for self as he moves toward the goal of adult maturity, which means essential independence and self-sufficiency.

Since growth is a process, it cannot be forced or coerced or deliberately delayed or denied without causing difficulty. To be successful, growth must proceed at its own tempo.

Just like every human being, the child lives in relationship to others. Initially, this relationship involves primarily the mother, then others. When these relationships are in good order, the child develops more adequately than when the opposite prevails.

While the child at birth is able to perform a surprising number of tasks for himself—and he must perform them to grow—he is helpless and dependent. The process of maturation is essentially a slow but steady change from a state of dependency and helplessness to one of independence and self-sufficiency. Success or failure in attaining this goal depends in large measure upon how the child is helped to learn about himself, others, and the world in general and how he develops techniques for independent action in accordance with his potential.

The kind of help a child receives from his parents and others depends upon the adults' feel-

ings about him, their understanding of the basic process of growth, and the manner in which his total needs are met. The atmosphere of the home in which he grows is likewise important. Required also are love and acceptance, not because he is good or bad or attractive or unattractive but only because he is he.

Within the setting of the family, the child learns about obedience, authority, people, sex, what is expected of him by others and what he may expect of others, and what his goals and motivations in life are at each stage of development and what they eventually will be. Also, he learns how to get along with himself and others. Phrasing this thought a bit differently, he learns technics of reaching the goals at each stage of maturation and finally his adult goals.

Montagu⁴ has recently emphasized that: "Babies are born cooperative. What they want is to be cooperated with and to cooperate. . . . Man is not born evil, nor is he born neither good or evil, but in a very positive sense he is born good. . . . When one analyzes the basic needs of the human organism, those needs which must be satisfied if the organism is to survive, one finds they are oriented in the direction of cooperation, of wanting to be cooperated with and loved." If every parent, as well as all of us who care for children, could be oriented in this basic notion, what a profound effect it would have on the rearing of every child!

Growth is also a process whereby "difference" constantly needs to be reconciled. This involves struggle and tension which at times may become overwhelming. When it becomes so, the child may seek refuge in (1) withdrawing to a simpler mode of living, (2) becoming aggressive or "acting out" his tension, or (3) becoming ill in an effort to maintain the integrity of self. Finding solutions to the demands of everyday living are important to every individual, young or old. Accepting this simple fact should help us appreciate more fully the child's struggle as he strives to maintain a sense of dignity and balance in his own living. No longer can the child be regarded condescendingly with the attitude of "little people—little problems." His problems are of as much importance to him as ours are to us. As the child's struggle is viewed from this vantage point, it is often possible to help not only him but also his parents by defining the possible sources of tension and bringing about their amelioration.

A very real and significant difference exists between the practice of medicine with adults and with children. Primarily because this difference is so simple it is often overlooked. The differ-

ence is in the patient-physician relationship. With adults, it is primarily a direct one-to-one affair. With children, the physician and two or more individuals are invariably involved. This fundamental difference is important from the viewpoint of therapy as well as of diagnosis. Search for pertinent factors intrinsic in the complaint involves three main areas, none of which, of course, exists in pure culture. These areas are: (1) Do the parents have a problem or concern about the child? (2) Is the child ill? (3) Does the complaint represent a problem of disturbed parent-child relationship? The therapeutic implications are easily appreciated.

The basic difference between adult and child medicine also has implications in the several roles in which the pediatrician serves. First and foremost, he is a physician especially trained in understanding children and their illnesses and diseases and also in what to do about them. However, in addition, he serves in the role of an educator and counselor and, in a sense, in the symbolic role of parent to the parents of his families. This important role of "symbolic parent" calls for the physician's examination of his own attitudes toward responsibilities, patients, parents, himself, and perhaps his procedures. Unquestionably, the manner in which he manages parents and children reflects his basic orientations and attitudes, that is, how direct and authoritarian or how permissive and accepting he is. Is he oriented in the direction of *helping* parents find solutions or does he offer tailor-made solutions? Appreciation of the varied roles the pediatrician must assume has important implications in moving toward the development of preventive mental health services.

Nearly every child born in our country today has been under prenatal care and is delivered by a physician. While many children continue under the care of the physician in general practice, an increasing number of children are reared under the guidance and direction of the pediatrician. In what areas, then, can he function and how? First and foremost, he can function in the education of parents—particularly young parents. They need help to understand the child's nature, total needs, and growth process. They need help to develop their own potential for becoming adequate parents.

One of the greatest opportunities for promoting mental health comes in the infancy and early childhood period. Many problems of maladjustment have their roots in the unskillful handling of the everyday experiences of feeding, weaning, sleeping, toilet training, sibling rivalry, and the frustrations incidental to development.

Years ago, Aldrich⁵ aptly expressed this point: "In the early years of childhood, physical and mental functions are so merged in the plan of growth that they cannot be considered separately. In fact, at this age mental growth is measured by physical accomplishments. Since this is so, there can be no mental hygiene as sharply distinguished from physical hygiene. Considerate physical care is good mental hygiene in infancy. To give a baby all the warmth, comfort, and cuddling he seems to need; to meet his wishes in the matter of satisfying and appropriate food; to adjust our habit training to his individual rhythm; and to see that he has an opportunity to exercise each new accomplishment as it emerges; these are beginnings of a forward-looking program in mental hygiene."

Currently, many pediatricians are giving serious thought to promoting the establishment of adequate parent-child relationships. The trend toward the rooming-in plan for young mothers who wish to assume responsibility for the child while in the hospital gives promise of helping mother and child get a more adequate start than has been possible previously. The avoidance of rigid schedules in rearing young children is likewise easing many anxious moments, as is teaching parents what can be expected of a child at any stage of his development. Likewise, the encouragement of permitting the child to assume responsibility when he is ready has important implications for mental health. Assisting parents to define and set limits for the child is of significance, since clinical experience has demonstrated how essential this is for the child's own security.

Many opportunities exist for promoting mental health by ameliorating parental anxieties which often have a devastating influence on the child. Parental concerns sometimes begin at the time of birth when the immediate question "Is he all right?" is uppermost. Most newborns are all right, but occasionally an inadequate child is born. When there is no doubt about a child's deficiency, a forthright sympathetic consideration of it with both parents can do much toward helping parents maintain an attitude of mental balance. Procrastination or delay cannot forestall the inevitable day of reckoning with its attendant difficulties and disappointments.

Assisting parents with a child who is mentally defective is not an easy or pleasant task. Yet it is an essential task which carries with it many opportunities for improving mental health. Recognizing that the core of the problem is parental anxiety keeps the problem in proper perspective. Tensions are ameliorated by helping parents to a realistic acceptance of the child, by offering

them the best possible explanation for the deficiency, and by projecting what the outlook for the future is and helping to plan constructively.

It is not uncommon for a physically handicapped child to compensate for his deficiency by making excessive demands for attention and consideration as one who has a special claim on life. Helping parents who are overprotective, overanxious, or resentful of the child's deficiency may be arduous but is necessary for the mental health of all concerned.

During the preschool years of the average child, certain periods prove to be more stressful than others. As he changes from a relatively sedentary existence to a more active one late in the first year, many parents are grateful for help not only in understanding what is going on in their child but also in how to get ready to manage him. Permitting the child to do for himself, as he indicates the interest, helps him develop his skills and technics for increasing independent action. Toward the end of the second year, the child begins to realize more fully his own individuality. Parents are often threatened by his vigorous assertion of self. Lacking an understanding of what is taking place, some parents are prone to bring undue pressure on the child at this critical time, which may complicate living for all concerned. While the child may be vigorous in self-assertion, he still is dependent and requires sympathetic support during those occasions when he is hesitant or frightened. Support and guidance of the parents at such times greatly strengthens the parent-child relationship so important to mental health.

Nearly every child goes through a period of stumbling over words or repeating them in an effort to gear his thinking process to his capacity to verbalize easily and smoothly. Allaying parental anxiety at this time can do much toward preventing many later speech problems.

A critical time for many children comes when they start school. This usually means venturing into a new world without the known and familiar supports of the home. Parental guidance at this trying time can help all concerned and may avoid later school problems.

Failure is a serious threat to each of us, and so it is with the child. When he begins to fail in school, either in his academic performance or in his social adjustment, it is an indication that something is wrong. Careful study to de-

termine the sources of difficulty early prevents more serious difficulties later.

Many other stressful situations could be mentioned. However, if I could emphasize only one significant point, it would be the need to search diligently in all areas of the child's living to find the sources of a problem. In most instances, the answers can be found in the failure of parents and others to anticipate or provide adequately for the basic needs of the child. Most parents desperately sense their failure and seek help. The pediatrician's opportunity rests in his willingness to look at their problems and, with the parents, to seek to define sources of difficulty and find solutions.

Likewise, the pediatrician's direct relationship with the child carries with it many opportunities for promoting mental health. Too often, the child's need to develop a relationship of confidence and trust in the physician is overlooked or disregarded, largely because of the pressure of the everyday work load.

In some instances, the child is inadequately prepared for medical or surgical procedures. When this occurs, the risk of later problems is increased. It is far better to make certain, whenever possible, that he is fully prepared for whatever is to be done. Such care will reassure the child rather than instill fear and anxiety which may cause trouble later. Parental cooperation and understanding are also of vital importance.

Basic research has proved beyond doubt the close relationship between stress and bodily function. The pediatrician's recognition and acceptance of the mind-body relationship in asthma, convulsive states, and disorders of the gastrointestinal tract, to mention only a few, will help to avoid errors in management, thereby promoting mental health.

Many other areas could be mentioned in which the pediatrician can be effective in the promotion of mental health and in the prevention of serious adjustment problems. One point requires emphasis: As soon as the pediatrician recognizes and understands how and why he must help to educate parents, we will have taken another significant step toward the development of a program of preventive mental health services. To be effective, such a program must be centered in the physician, particularly in the pediatrician. His is a challenging opportunity and a singular responsibility!

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Albert Justus Chesley, M.D.

A Personal Tribute

W. P. SHEPARD, M.D.



THE DEATH on October 17, 1955, of Dr. A. J. Chesley, secretary and executive officer, Minnesota State Department of Health, marks the passing of one more of a generation of devoted public servants the like of which we may never see again. He and his thinning ranks of contemporaries led a life dedicated, even beyond that of their fellow physicians, to serving the public. Somewhere, somehow, these men and women caught the spark of saving life and preserving health en masse, though to do so in their early day called for much personal sacrifice. Thanks to their inspiration and persistence, the trail was blazed for the present broad highways of public health over which this nation now attains the low death rates and long life expectancy so miraculous compared with only fifty years ago. In 1905, Dr. Chesley was well launched on his public health career.

In those days, even as now in some localities, any "government doctor" was suspected by his fellow physicians and often the public. I well remember the day in 1913, before a Student Health Service existed, when Dr. Chesley and his associate Dr. Greene walked into my fraternity house and put us all in quarantine because I had diphtheria. I expected expulsion from the fraternity, far worse than death to me then; and my doctor who had ordered antitoxin without reporting the case was highly incensed at this "government interference." I can still

see Dr. Chesley fixing his clear blue eyes upon my doctor, explaining quietly but firmly that diphtheria was a reportable disease and that the university campus was state property, therefore under the jurisdiction of the State Department of Health.

Dr. Chesley prized his status as an M.D. highly. And well he might, since he earned his way through medical school after returning from the Philippines where he served with the thirteenth Minnesota Volunteers in 1899. It took the courage of firm conviction for him to choose a career in which, as he often said, his fellow physicians would regard him as a maverick, "a zebra without stripes or a horse with stripes." But he never wavered after coming under the influence of Drs. Hill, Wilson, Westbrook, Mullen, and Bracken. After that first professional service in 1913, it was my good fortune to see him and learn from him many times in his dealings with fellow physicians. Always firm, always patient, always willing to take unlimited time, he gradually convinced them that there was such a thing as public health, that dealing with the population at large was not invading the prerogatives of the private physician for whom he had the highest regard, and that there was something scientific in this new field called "epidemiology."

Perhaps his greatest and least recognized service was to the medical profession of his state and the nation, gradually gaining their support and understanding of the principles of public health and gradually teaching the public what to expect of their doctor.

W. P. SHEPARD is second vice president, Metropolitan Life Insurance Company, New York City.

More than any other single individual, and with all due credit to his distinguished predecessors and his able and loyal staff, Dr. Chesley was responsible for placing the Minnesota State Health Department at the forefront of state health departments in that day. To him it was a proud heritage that Minnesota was among the first states to organize a State Board of Health. He often explained to us younger staff members that this meant we were twenty years ahead of the other states and must remain that way. Minnesota was among the first midwestern states to be admitted to the birth and death registration area by the United States Census Bureau, among the first to establish a "Pasteur Institute" for the manufacture of rabies vaccine, to differentiate diphtheria bacilli by morphologic types, to manufacture typhoid vaccine approved by the surgeon general, to institute morbidity records on the contagious disease history of school children, to tackle the tuberculosis problem on Indian reservations, and to admit Indian cases to public sanatoria. One of his latest victories was the transfer of the Indian medical services to the Public Health Service, a task which looked impossible when first advocated. Dr. Chesley led others by example, by doing instead of talking. So often at national meetings he said quietly and without boasting, "This is the way we do it, and it has these advantages."

He was president from 1924 to 1927 and secretary from 1927 to 1945 of the State and Provincial Health Authorities, and played an active role in the State and Territorial Health Officers Association. In these fields, his alert mind and his voluminous records and correspondence confronted them with new and challenging problems. He had the rare ability to write a report or resolution while listening to another report or resolution and do full justice to both.

No public servant ever devoted himself more wholeheartedly to his job. Each day seemed too short to accomplish his self-appointed tasks. Nights, Sundays, and holidays he worked, requiring little sleep and often spending the late night hours writing his friends long letters to inform them of recent developments and seek their advice. Yet he never

showed fatigue-irritability to those of us lucky enough to be on his staff.

When frustrated by political interference, as he often was over the years, his reaction was to blame no one, but to redouble his own efforts. We on the staff took new courage from his example and "closed ranks" to cover the work of those missing for lack of appropriations. Yet he never lost sight of his objective and when the right opportunity presented, he moved in fast.

One of the most difficult assignments he ever undertook was the Red Cross Commissionership to Poland in 1919. On a cold, rainy day in Paris, dressed in a trenchcoat which he wore for many years afterwards, he lined up in front of the Hotel Dieu a pitifully small band of personnel, a few camions, and a small truckload of supplies and left for Warsaw. Within a few weeks, however, he had recruited as fine a staff of young, able doctors as ever worked for the Red Cross. His seemingly impossible accomplishments there became legendary and led to his decoration by the Polish government.

To have worked for Al Chesley meant you were "made" for life in his book. Though seldom given to direct praise, he made it a point to tell others of our merit. Many of the virtues he saw in some of us, notably myself, must have been illusory. But when such praise reached our ears, we were so surprised and proud to hear that he thought so well of us that we did our best to live up to his expectations. I, for one, am eternally grateful for the opportunity of having been brought up in Al Chesley's practical school of public health. He was my father, teacher, and mentor in public health.

No one can name the thousands living today who owe their lives, quite unknowingly, to Albert Justus Chesley, M.D. These are the persons who but for his devotion to the cause of preventing illness would surely have died of typhoid, tuberculosis, diphtheria, smallpox, scarlet fever, enteritis, childbirth, or other preventable causes. Their number is legion and includes all ages, races, and religions. They, their children, and their children's children are living proof of the eternal worth of this man's life.



This department of THE JOURNAL-LANCET is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

Complications of Intramedullary Fixation of Long Bone Fractures

Fatal Pulmonary Embolism During Nail Insertion

EDGAR S. BRINTNALL, M.D., AND
LAWRENCE O. ELY, M.D.

Iowa City and Des Moines, Iowa

INTRAMEDULLARY FIXATION of long bone fractures has been practiced sporadically for over fifty years¹ but has gained great popularity recently.² Although intramedullary nailing is used in a variety of long bone fractures, the procedure finds its greatest usefulness in fractures of the femoral shaft, especially in transverse femoral shaft fractures, and particularly in instances in which the fracture is pathologic.³ Its advantages are twofold: (1) if properly applied, remarkable stability of reduction is provided, allowing the early resumption of active use of muscles and joints in the region of injury; and (2) the fractured bone ends are not held apart as bony absorption occurs at the fracture site. The compression forces due to early partial weight-bearing are believed to hasten bony healing in fractures of the lower extremities.

EDGAR S. BRINTNALL, a 1938 graduate of the University of Iowa College of Medicine, is clinical associate professor of surgery at the University of Iowa and chief of surgery at Veterans Administration Hospital, Iowa City. LAWRENCE O. ELY, a 1943 graduate of the University of Iowa College of Medicine, is on the staffs of Iowa Lutheran Hospital, Iowa Methodist Hospital, and Mercy Hospital, all in Des Moines.

Complications resulting from intramedullary fixation of fractures are due to open reduction or to the mechanics of the nail insertion.⁴ Fat embolism occurs more frequently with the intramedullary fixation⁵ than with other types of fixation. However, the complications resulting from intramedullary nailing are not of such a degree or of such frequency as to contraindicate the use of this procedure in suitable circumstances.

Intramedullary nailing was used upon 40 patients during the years 1947 through 1951 at the University hospitals in Iowa City, Iowa. In this group of patients (table 1), 2 fatal complications and 4 nonfatal postoperative complications occurred. In addition, 3 "nail" complications occurred during operations but were corrected during the procedure (table 2). Thus, these can be classed as technical difficulties only (figures 1 and 2). The clinical picture of fat embolism did not develop in any patient. Infection with hemolytic *Staphylococcus aureus* involving the left humerus was the cause of 1 death (C.B.), and terminated in a septicemia and bacteremia with multiple metastatic abscesses. This nailing had been used for a simple fracture of the humerus

From the department of surgery, College of Medicine, State University of Iowa, Iowa City, Iowa.

TABLE 1
COMPLICATIONS OF INTRAMEDULLARY NAILINGS

<i>Fatal complications</i>		
C.B.	Osteomyelitis, bacteremia	Died 4 mo. postoperatively
E.M.	Pulmonary embolism	Died during nailing
<i>Nonfatal complications</i>		
F.K.	Wound infection	Subsided
R.A.	Hip pain over nail end	Improved after 2 yrs.
L.W.	Chronic osteomyelitis	Draining sinus at 1½ yrs.
W.T.	Infected wound hematoma	Subsided

TABLE 2
TECHNICAL (OPERATIVE) NAIL COMPLICATIONS

M.D.	Misdirected nail extruded from thigh. Nail replaced accurately.
M.E.	Partially inserted nail in "Paget's" femur could be neither advanced nor withdrawn. Projecting nail cut off and fracture plated.
M.R.	Nail split during insertion, one part curving away into soft tissues. Nail removed and another nail inserted.

in which reduction could not be maintained by a closed method. The source of the infection was not established. Death occurred in spite of supportive treatment, the use of sulfonamides and antibiotics, and the removal of the intramedullary nail. The second death (E.M.) was due to pulmonary embolism which occurred while the patient was on the operating table having a Küntscher nail inserted. This case seems to be of unusual interest and is reported in detail.

CASE REPORT

E.M., a 72-year-old white woman, was admitted with the complaint of having fallen five days previously "breaking her right leg." She had been hospitalized in a neighboring hospital, in which the fractured extremity was placed in traction. Three days later, an umbilical hernia of thirty years' duration became enlarged and tense. Abdominal cramps ensued. A Levin tube was inserted and enemas were administered without relief. She was transferred to the University hospitals, Iowa City, on June 12, 1951. The following findings were the pertinent points in the physical examination.

The patient was alert, moderately dehydrated and acutely ill. There were no abnormalities of the head, neck, heart, or lungs. The pulse rate was 90 per minute and the blood pressure measured 130/90. The abdomen was distended and tympanitic. Bowel sounds were hyperactive and "obstructive" in character. A tense, moderately tender, irreducible umbilical hernia 30 cm. in diameter was present, over which the skin was slightly cyanotic. The right lower extremity was immobilized in a Thomas splint. Roentgenograms of the right femur showed a spiral fracture of the femoral shaft at the junction of upper and middle thirds. Films of the abdomen showed multiple fluid levels in distended loops of both large and small bowels. Urinalysis revealed no abnormalities. Hemoglobin measured 12.5 gm.; the red blood cell count was 4,900,000; and the white blood cell count was 14,700 per cubic millimeter.

After the administration of intravenous fluids, laparotomy was performed a few hours after admission. Through a transverse incision the umbilical hernial ring was opened. A gangrenous appendix within the hernial sac was excised, and normal colon and omentum were re-



Fig. 1. Intramedullary nail partially inserted into dense "Paget's" femur. Nail segment remains as nail could not be further inserted nor removed. Pathologic fracture of right femur healed slowly after fixation by metal plate.

placed into the peritoneal cavity. Hernioplasty by imbrication was performed. The patient tolerated the operation well and her postoperative course was free of complications. The histologic diagnosis of the excised appendix was "Hemorrhagic necrosis, appendix."

On June 19, 1951, the patient had apparently recovered from the laparotomy. She was returned to the operating room for open reduction and intramedullary nailing of the femoral fracture. The operation was performed under nitrous oxide-oxygen-Pentothal anesthesia. Through a lateral thigh incision, the fracture site was exposed; a guide pin was driven through the medullary canal of the proximal fragment from below upward and out of the lateral hip region. A hollow type intramedullary nail was then threaded over the guide pin and driven through the proximal femoral shaft across the reduced fracture into the medullary canal of the distal fragment. Just as the insertion of the nail was being completed, the patient suddenly became cyanotic. Pulse and respirations ceased. A clinical diagnosis of pulmonary embolism was made. Throughout the operation prior to the sudden death, the patient's blood pressure, pulse, and respirations had been stable, and her color and general condition had been good. Cardiac arrest due to "asystole" or ventricular fibrillation was not believed to have occurred. Efforts to resuscitate the patient were of no avail. She was pronounced dead.

Autopsy was performed five and one-half hours after death. The pathologic summary is as follows: "At autopsy, which was limited to the trunk, the principal findings were multiple, large, loose emboli in the right



Fig. 2. Nail split during retrograde insertion from right femoral shaft fracture. No serious soft tissue injury resulted. Satisfactory fracture fixation was obtained by removing the split nail and inserting an intact nail.

auricle, right ventricle and pulmonary arteries; and infarction of the lower lobe of the right lung and a small portion of the lower lobe of the left lung. There was pleural effusion on the right and pulmonary edema. The origin of the emboli could not be determined due to autopsy restrictions. They most probably originated in the veins of the right lower extremity. Incidental findings included cholecystolithiasis, generalized arteriosclerosis, multiple diverticula of the sigmoid colon and cystic changes in atrophic endometrium. There were also wounds resulting from a recent open reduction of fracture, right femur, and a recent repair of ventral hernia. Death was due to multiple pulmonary emboli."

DISCUSSION

The number of fatal and nonfatal complications in this series seems excessive, but the series is too small to be statistically significant. Also,

these 40 patients were operated upon by 23 different resident and staff surgeons, many of whom had had no previous personal experience with the procedure. The 2 wound infections (F.K. and W.T.) were of a minor character and responded rapidly to appropriate treatment. The 2 instances of osteomyelitis represented major complications, 1 patient (C.B.) dying as a direct result of infection with hemolytic *Staphylococcus aureus* and the second (L.W.) maintaining a persistent osteomyelitis which did not respond to antibiotic therapy or to removal of the intramedullary nail. This patient was last seen one and one-half years after the nailing. The infecting organism in this case was also hemolytic *Staphylococcus aureus*. All these infections must be assumed to be due to contamination during the operation, as in no instance did evidence indicate hematogenous or other type spread from any focus of infection.

The operative fatality due to pulmonary embolism during insertion of an intramedullary nail invites postulations. In spite of lung infarcts found at autopsy indicating previous embolism, the patient died from massive embolism occurring during bone manipulation. Probably without such trauma, venous thrombi would not have been dislodged causing the patient's death. We feel that such a traumatic procedure as intramedullary nailing should not be carried out in elderly, obese patients during that period after fracture in which pulmonary embolism is statistically of greatest frequency. Either early, within four days after fracture, or late, beyond two weeks after fracture, nailing is preferable to nailing twelve days after a fracture. This death occurring coincidentally with the driving of the nail forces the conclusion that mechanical trauma may have dislodged previously unrecognized venous clots.

SUMMARY

Among 40 patients, 2 fatal and 4 nonfatal complications occurred as a result of intramedullary fixation of long bone fractures. Fatal pulmonary embolism occurred during the insertion of an intramedullary nail in 1 patient. This death may have been due to mechanical dislodgement of venous clots.

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Counseling in Medical Genetics, by SHELDON C. REED, 1955. Philadelphia: W. B. Saunders Co. 268 pages. \$4.00.

A book that is small and short but at the same time discusses the topic adequately and with authority and up-to-date knowledge is rare and always a joy to find. A technical subject discussed in such simple English that even a layman can understand most of it is also good to find. Finally, it is a joy to find that the author can write with charm and even a touch of humor.

This book has all the virtues that have just been mentioned. Dr. Reed is head of the Dight Institute for Human Genetics at the University of Minnesota, and he knows his subject well with all its ramifications. He tells us what counseling in human genetics is. As he says, unfortunately people usually come for help after they are in trouble.

Professor Reed tells what the common problems are; he talks of the philosophy of counseling. People are not told what they *must* do; they are told, when information is available, what the chances are of their bearing defective children if they should marry. Then the couple must decide for themselves what to do.

We find a note about the laws in the several states which deal with consanguineous marriages. We learn something about twins; we learn why relatives had sometimes better not marry; and we learn something about the carriers of disease who can cause so much trouble. Dr. Reed tells of the most common causes for seeking advice in regard to risks of childbearing. Heading the list is skin color, and then follow epilepsy, consanguinity, mental deficiency and mongolism, schizophrenia, harelip and cleft palate, eye color, twinning, Rhesus factors and erythroblastosis, cancer, spina bifida and hydrocephalus, Huntington's chorea, diabetes, albinism, allergies, hemophilia, paternity determination, manic-depressive psychosis, fibrocystic disease of the pancreas, and sterility.

In chapter 14, Dr. Reed discusses the factors that cause some children to be thin and some fat. There is a good chapter on disputed paternity, and others on clubfoot, congenital heart disease, pyloric stenosis, congenital dislocation of the hip, blood genetics, rheumatic fever, tuberculosis, diabetes, and the genetic effects of radiation. The illustrative examples that are given at the close of most of the chapters are very helpful and instructive. An excel-



lent appendix mentions briefly or defines some of the very rare hereditary troubles.

This is a book which can be read with tremendous interest by many lay persons. It should be read by every human being who is interested in the hereditary curses of man. It will open the eyes of all physicians in every specialty including psychiatry to a field of medicine almost unknown to them.

WALTER C. ALVAREZ, M.D.

The Human Brain in Sagittal Section, by MARCUS SINGER, and PAUL I. YAKOVLEV, 1954. Springfield, Illinois: Charles C Thomas. 81 pages. Nonflexible binding, \$7.75. Flexible binding, \$6.25.

This small atlas is a delight to examine. It represents a new high in technical achievement both in the preparation of the sectioned material, and of the photographic reproduction. There are only two series to compare with these sagittal sections. The first is that splendid series of pen and inks of a parasagittal series drawn with consummate skill by Professor Rasmussen from sections originally prepared by J. B. Johnston. This series has been incorporated in the atlas abstracted from the old Villiger's textbook, and though it follows the main series of cross sections, the skill and perception of its execution quite outshines the older drawings. I watched Dr. Rasmussen make these superb drawings and feel that they represent a monument to his career as a neuro-anatomist.

The other comparison is, naturally, Riley's masterful "Atlas of Basal Ganglia, Brain Stem, and Spinal Cord," now unfortunately out of print. Riley's work, like Rasmussen's, was a labor of love. But a quality was achieved in spite of the rather indifferent sections and the difficult labeling, which may never be seen again. I have set comparable sections of the two books side by side. The beauty of Singer and Yakolev's contribution is at once apparent, as is the clarity of the label-

ing. The serious student will, however, find twice the number of labeled structures in Riley.

There is no text other than the introductory essays, but 34 pages of analytical index is the heart of the work. Neither a complete atlas nor an exhaustive reference work of neuroanatomy, this beautiful volume will find a place on the shelves of anyone who is a student of the brain. The authors have set a standard of beauty and accuracy and have enriched the literature.

BERRY CAMPBELL, Ph.D.

Laboratory Identification of Pathogenic Fungi Simplified, by ELIZABETH L. HAZEN, Ph.D., associate bacteriologist, and FRANK CURTIS REED, laboratory illustrator and photographer, Division of Laboratories and Research, New York State Department of Health, Albany, New York, 1955. Springfield, Illinois: Charles C Thomas. 108 pages. \$5.50.

This monograph should be of considerable value to the microbiologist in the diagnostic laboratory and to the student who is desirous of effecting a superficial acquaintance with the more common pathogenic fungi. Textual simplicity is consciously designed as this publication represents the end product of many years of teaching medical mycology to laboratory workers and physicians who had restricted background training in this specialized field.

The principal worth of this treatise lies in the illustrative material used to define the distinctive morphologic characteristics of each pathogen. The photomicrographs are excellent and are far superior to those seen in most of the recognized mycologic texts. It is regrettable that the authors did not see fit to include a section devoted to the common saprophytic contaminants, as these fungi constitute the greatest single source of consternation to bacteriologists with a limited degree of training and experience in mycology. Dr. Hazen is to be commended for employing the more widely accepted binomial designations and avoiding the controversial synonyms and antiquated names that plague much of the literature and texts. Descriptive writing is limited to absolute essentials which are uniformly accurate and free from the usual ambiguities. For those who desire merely to identify a mycotic agent, the monograph is estimable. Beyond this point, however, the provided selective references must be consulted.

FRANK J. ROTH, JR., Ph.D.

American College Health Association . . .

We wish to welcome two new members whose applications have been unanimously approved by the Executive Committee of the association.

Colorado Women's College, 1800 Pontiac Street, Denver, Colorado. Representative: Val H. Wilson, Ph.D., president. Alternate: Geraldine Mast, M.A., dean of students.

Central Missouri State College, Warrensburg, Missouri. Representative: LeRoy A. Harper, Ed.D., chairman, Division Health and Physical Education. Alternate: Ella R. Mays, R.N., college nurse.

An invitation to hold the 1958 annual meeting of the American College Health Association in Toronto on May 1 through 3 has been received from G. E. Wodehouse, M.D., director of the University of Toronto, with the University of Toronto acting as host. The invitation will be placed on the agenda for the next council meeting.

Muriel Farr, R.N., Bryn Mawr College, chairman of the Committee on Nursing Services in College Health Departments, states that the American Nurses Association has indicated a desire to send a representative to the next annual meeting in Minneapolis.

Miss Farr also nominates Miss Mabel Beard as the nurse with the longest continuous record in college health work. Miss Beard retired in June, 1955, from Haverford College, Haverford, Pennsylvania, after thirty-six years of continuous service.

SECTION ACTIVITIES

An organizational meeting of the Southern Section of the American College Health Association was held in Gainesville, Florida, on October 21 and 22, 1955, with the University of Florida acting as host.

Officers elected were: president, Dr. R. H. Vadheim, University of Florida; secretary-treasurer, Dr. Haviland G. Hathaway, Florida State University.

The program included a conducted tour through the new medical college at the University of Florida. It was decided that the next meeting should be a two-day meeting to be held at Greensboro, North Carolina, during the third or fourth week of June.

PERSONNEL

William Lester, Jr., M.D., a member of the Research Committee of the American College Health Association, has resigned his position as director of the Student Health Service at the University of Chicago to accept the appointment as chief of staff to the Suburban Cook County Tuberculosis Sanitarium District.

Dr. Henrietta Herbolzheimer has been appointed to succeed Dr. Lester as director of the Student Health Service at the University of Chicago and is now the official representative of that institution for American College Health Association activities.

Charles H. Howarth, M.D., is the new director of the University Health Service at the University of New Hampshire, Durham, New Hampshire. Dr. Howarth served with the United States Medical Corps for eight years and was a member of the Military Aid Advisory Group to the Nationalist Republic of China in Formosa. He left his position with the Lemuel Shattuck Hospital, a chronic disease institution in Massachusetts, to assume the directorship of the Health Service at the University of New Hampshire.

James B. McLester, M.D., is the new full-time director of the Student Health Service at the University of Alabama, University, Alabama. Dr. McLester assumed his new duties on September 1, 1955.

John Ware, M.D., of New York City, has been appointed physician-in-charge of the new Ebersole Student Health Clinic at Cornell College in Mount Vernon, Iowa.

A graduate of Yale University, Dr. Ware received his M.D. degree from Johns Hopkins University, Baltimore. Before coming to Cornell he was resident in medicine at St. Luke's Hospital in New York City.

Dr. Ware's appointment is under the terms of the wills of the late William and Francis Ebersole, brothers who had a longtime association with Cornell College. Their wills set up a trust fund which provided for the construction of a Student Health Center, completed last summer. The wills specified that a physician experienced in the practice of medicine should be selected from a top ranking medical school.

R. A. Murchison, colonel, MC, who has had twenty-seven years service in the regular army medical corps including approximately fifteen years experience in hospital administration, joined the staff of the Health Service at Ohio University, Athens, Ohio, on October 1, 1955.

Dean Robert Kamm of the Agricultural and Mechanical College of Texas, College Station, Texas, states that his institution is desirous of securing the services of a career man in the field of student health to act as superintendent of the 160-bed college hospital and director of the Student Health Service. Most of the 7,000 students live on the campus. Anyone interested should write to Dean Robert E. Kamm, Student Personnel Services.

Certain changes in the committee membership list published in last month's Newsnotes have been received:

Melbourne Murphy, University of Michigan, Ann Arbor, Michigan, should be added to the Committee on Environmental Hygiene.

Glen R. Leymaster, M.D., University of Utah, Salt Lake City, should be deleted from membership of the Committee on Faculty Medical Care.

A. O. DeWeese, M.D., Kent State University, chairman of the Committee on Health Education, sends the following complete list of his committee:

Jeannette Evans, M.D., Cornell University; Ruth E. Grant, Ph.D., University of Minnesota; Alma Nemir, M.D., University of Utah; K. Francis Scott, M.D., Smith College; Dean Smiley, M.D., Association of Medical Colleges, Chicago; J. N. Lawless, M.D., West Virginia University; W. Roy Mason, Jr., M.D., University of Cincinnati; Edward J. Dvorak, Ph.D., University of Minnesota.

J. G. Grant, Iowa State College, chairman of the Committee on Health Service and Physical Activities, asks that Patty Grove, M.D., Mt. Holyoke College and Fred Miller, M.D., University of Oregon, be deleted from his committee and that the name of Russell Blemker, M.D., University of Oregon, be added.

Saxon Pope, M.D., University of California, Berkeley, has resigned from the Committee on Mental Health.

Muriel Farr, R.N., Bryn Mawr College, chairman of the Committee on Nursing Services in College Health Departments, states that she has received acceptances from the following asked to serve on her committee:

(Continued on page 24A)

Comments concerning this Section, criticisms, or suggestions for papers will be most welcome. Physicians are cordially invited to submit articles pertaining to pain for consideration. All inquiries and manuscripts should be sent to Dr. John S. Lundy, 102 Second Avenue Southwest, Rochester, Minnesota, or to the Editorial Department, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis, Minnesota.

Electroshock Therapy in Atypical Pain Syndromes

DAVID A. BOYD, JR., M.D.

Rochester, Minnesota

PAIN is such a commonly shared experience and so universally known that we have come to think of it as an uncomplicated and simple sensation. This attitude has been fostered by the fact that the lower-neuron pathways and their extension upward to the cerebrum are well known and accurately outlined. This has encouraged the belief that pain can be explained simply as a stimulus-recognition response, mediated and appreciated as are other sensations. However, a more thoughtful consideration soon reveals that pain is a much more complex phenomenon and cannot be understood in such an unelaborate neurophysiologic manner.

The conscious appreciation of pain may vary greatly on the basis of different psychological states.¹ Some individuals may become consciously insensitive to pain during periods of great emotional turbulence. Sometimes states of mystical and religious ecstasy may render the individual incapable of perceiving painful stimuli. In states of rage and when fighting, severe and supposedly painful injuries may occur without recognition by the combatant. Patients suffering from disordered mental states may incur severe wounds and yet show no apparent reaction. Others, in hysterical conversion reactions or in trance states, permit all sorts of traumatic stimuli with a *belle indifférence*. The obliteration of pain recognition by hypnosis is well known.

DAVID A. BOYD, JR., a 1930 graduate of Jefferson Medical College, is with the section of psychiatry at the Mayo Clinic, Rochester.

Pain is usually more keenly appreciated in those of delicate constitution than in those who are gross and burly, as is the case in the intelligent in contrast to the mentally obtunded.

Those whose profession it is to alleviate pain must have sometimes mused how wonderful a world without pain would be. This view overlooks all of the protective aspects of pain and all of its tremendous survival value. Pain warns us to withdraw from external threats and injuries; it alerts us to impending visceral destruction by disease. This was demonstrated² vividly and tragically in the instance of a small girl who had the rather unusual syndrome of congenital universal indifference to pain. Being incapable of protecting herself by the perception of pain, she injured herself severely and repeatedly. She casually picked off one side of her nose, wiggled her front teeth out, broke both arms and one leg, and suffered many terrible injuries because nothing hurt her. It was of no importance to her if she ran full tilt into a table even though she cut her head and broke her arm, and she continued to play until discovered by the parents. Aside from the awkwardness in using the broken arm or the inconvenience of bleeding, the episode was without meaningful sensation or significance to her. Although such cases are rare in the medical literature, they are always startling because of the extreme contradiction to the usual human attitudes and values. One man³ who had such a condition conceived the unique and grisly idea of using it for an entertainment career on the stage. His act was to undergo crucifixion with

spikes being driven through his arms. Although the program drew a full house, the syncope rate of the audience limited his career to a single performance.

The concept that pain is far more complicated than a simple sensation is not new. Some of the medieval thinkers probably had a more comprehensive understanding of the true nature of pain. They regarded pain as an experience comparable to pleasure; not as a sensation but rather as a "passion." They set pain aside from such sensory mechanisms as vision or hearing because it did not have special and exclusive sensory end organs. Rather, it was something that diffused throughout the whole organism, appearing to pervade and affect the whole person. In opposition to specialized types of sensation, pain as a feeling spread rapidly far beyond the local area or the exact sensory field, and the feeling tone of the whole person was affected by the inherent unpleasantness of this passion. Thus, the experience was regarded as having an affective or emotional feeling tone and a special quality which was something over and above mere sensory intake and appreciation.

Logically, if pain has such a primitive life-saving function and possesses powerful emotional components, it must also have neuro-anatomic and neurophysiologic foundations in a very ancient part of the central nervous system. Such is the case. The thalamus is old phylogenetically and is a lower center which is significant and important in the appreciation of painful impulses. Probably some degree of low-grade conscious appreciation of painful uneasiness or unpleasantness can occur on the thalamic level. The functions of the thalamic level probably do not rise above a poorly defined unpleasant hurting which pervades the whole person without accurate reference to a certain part of the body. The refinements of accurate localization and evaluation of the nature and intensity of the painful sensation are probably functions of the higher cerebral cortex.

These lower centers of functions dealing with unpleasantness and crude pain are our present concern. These centers serve as a basis for understanding psychogenic pain, that is, strong, unpleasant, hurting emotions, and sensations which then may be refined and referred to special parts of the body. The psychogenic aspect implies that the etiologic basis is some type of painful and disturbing emotional conflict. The conflict may be over some issue which results in unbearable anxiety or a horrible sense of guilt

which overwhelms the person. In some instances, it may represent a need for self-punishment or be the result of hostile and hating impulses. At times it may be the outcome of covert efforts to control persons or situations that cannot apparently be managed by more direct efforts. Any type of serious emotional conflict may serve as the basis but those relating to guilt or hostility are the most common.

An individual who is in such emotional conflict, especially if he must keep himself unaware of what he is troubled about, soon finds himself anxious and tense and pervaded by a general sense of unpleasantness. Some may just struggle along through life with these painful feelings; others seek psychiatric help as neurotic patients. But such states of tension and misery can be dealt with in other ways. Instead, such emotional turmoil may be tolerated for so long and then channeled out to the periphery by referring the feeling to a part of the body that may be already damaged and weakened either by an inherited organ inferiority or by previous disease. This is why the old pain returns to some patients repeatedly whenever they are under emotional stress, even though the original organic condition has been cured surgically. In other instances, the emotional conflict may produce peripheral physiologic changes in a part through spasm of involuntary muscle or vasomotor changes. Sensations then arise from the involved part and are reinterpreted centrally in the light of the total situation, and the sensory inflow is labeled pain. Finally, emotional conflict may be translated into symbolic forms and a part of the body chosen which is best able to symbolize the special nature of the problem. The chosen part then represents in a painful way the unhappiness and emotional turmoil of the patient.

Such an established syndrome of pain is like adding another member to the family. The pain becomes almost personified and takes on a character and nature of its own. The patient establishes a balance with the pain, and the rest of the family begin to live in accord with it. A whole new group of relationships becomes established both in the patient and in the family, and an entirely new setting is organized so that a *modus vivendi* can be worked out with the pain. The new equilibrium seems to have its benefits even though they are purchased at an extravagant price. The patient does succeed in expressing his emotional conflict whether as a discharge of anxiety, guilt, self-punishment, or hostility. Sometimes pain serves as a most convenient way

to express one's rage. "Now look, you've gone and hurt me again and my pain has returned." It may be the only way to escape an intolerable situation such as pregnancy, monotony, or a domineering mate. Sometimes it is a protection because even the most cruel and thoughtless hesitate to hurt further a person who is already in pain. Thus, as a shield and a protection the pain as a symptom may be maintained with all the vigor and single-mindedness the patient possesses. Some physicians have found that there are tricks that may be utilized to prove that the pain does not exist as such or to obliterate it. Instances have been observed in which this has been done and the patient suddenly has found himself confronted with unbearable and unmanageable conflict, and a fulminating major psychosis has been precipitated because he has been brought abruptly face to face with a problem which he previously so earnestly avoided.

The diagnosis of psychogenic pain is not always easy, and should not be reached on the basis of a single factor but rather on several. Among these should be the conclusion that no significant organic cause for the complaint can be discovered after adequate investigation. Or, if such a possibly significant somatic factor has been discovered, that appreciable relief has not resulted from intensive and reasonably protracted somatic therapy. Further, to establish a diagnosis of psychogenic pain, positive signs of emotional conflict or instability should be discovered in the course of psychiatric investigation. The final proof is the therapeutic test, that is, adequate psychiatric therapy that resolves the conflict and the presenting symptom of pain.

Successful psychiatric treatment of such atypical pain syndromes has presented a most difficult problem, especially when psychotherapy has been utilized exclusively. The symptom often appears to be so deeply embedded that a change of the patient's attitude or the ventilation of an emotional conflict has not reached far enough in its effects to resolve the problem. Therefore, in selected cases, an effort has been made to break up some of these reverberating circuits of pain, neurotic conflict, and depression by the use of electroshock therapy. The following are brief reports of the types of problems encountered and the results.

CASE REPORTS

Case 1. A 69-year-old woman was admitted to the hospital because of mental depression and left trigeminal pain of an atypical variety. A diagnosis of left trigeminal neuralgia and reactive depression had been made

twenty years before. Complete section of the posterior root of the left gasserian ganglion was performed at that time, resulting in complete relief of her pain. She remained fairly well in the intervening years but returned on the present occasion because she was again depressed and had severe left facial pain. No surgical procedures were indicated because the anesthesia was still complete over the left facial region. This left the mental depression as the only point of attack, and electroshock therapy was instituted. After 4 treatments, she was completely relieved of both the depression and the atypical facial pain. She remained well for four and one-half years until the death of a sister, who had always been a very disturbing factor in the home, and she then had a recurrence of both depression and facial pain. A remission of both complaints occurred after 5 electroshock treatments.

Case 2. A woman aged 42 years was admitted to the hospital because of twisting and pulling pain in the right upper quadrant of the abdomen. She had had 8 previous abdominal operations and did not presently appear to be in need of further surgical treatment. The results of extensive medical studies were negative and no definite organic pathologic condition was discovered that could be the cause of her bitter complaints. The psychiatric consultant believed that the patient was suffering from a mental depression which did not seem to be due to long-standing pain but appeared to be a depression in its own right. It was speculated that the abdominal pain might be one expression of the depressive syndrome. She was given 10 electroshock treatments, and both the depressive reaction and the abdominal pain completely disappeared. Both the family and the internist were of the opinion that the condition of the patient was better after electroshock therapy than it had been in years. She reported some time later that she had continued to remain symptom-free.

Case 3. A man aged 35 years was admitted to the hospital because of severe brachial-plexus neuritis secondary to administration of tetanus antitoxin. After one month he was dismissed as considerably improved but returned the next day stating that upon dismissal he had experienced an intolerable exacerbation of pain in the arm. During the next four months he complained constantly of pain so severe that he required regular medication with morphine and Demerol. All types of somatic therapy were used including two stellate-ganglion blocks, manipulation of both shoulders under anesthesia, and physical therapy of all types. None of these measures were of apparent benefit. In desperation, electroshock therapy was employed with complete relief of all symptoms and complaints after 11 treatments. His wife came to the hospital at this time for her first appearance in five months because she had purposely remained away. She explained that just before the onset of the patient's syndrome, considerable marital discord and much conflict had existed in the home because of his wish to dominate her completely and her ever-increasing rebellion concerning his attitude. She had not come to the hospital or communicated with his physicians because she was convinced that his painful syndrome was a conscious or unconscious device to bring her back into submission.

Case 4. A man aged 52 years was admitted to the hospital because of low back pain which extended down both legs. He had had a laminectomy with removal of ligamentous tissue six years before, but this procedure had brought no relief. Since then he had sought relief in analgesics, taking 4 gr. of codeine per day. All med-

ical studies failed to reveal any organic condition that could reasonably cause his complaints. However, it was found that he had had a complicated emotional problem relating to marital unhappiness and to subtle but complete subjugation by a domineering wife. He was incapable, both constitutionally and by reason of early emotional experiences, of rebelling against her but apparently was converting all of his frustrated rage and unhappiness into back pain. He was antagonistic because of psychiatric consultation and incensed about curtailment of his sedative medication with consequent increase in his physical distress.

He was given 8 electroshock treatments which resulted in complete remission of his back pain. As he became more comfortable he was able to ventilate a great portion of his conflicts concerning marital unhappiness. As the pain in his back began to be replaced by a steely glint in his eyes, he began to take a firmer stand with his wife. At this point she came to the psychiatrist in a panic stating that she had run everything all of her life and did not see how she could change now. As the husband became better, the wife disintegrated in an acute anxiety neurosis. At the time of dismissal, the husband was symptom-free and the wife miserable because he had changed so much. It was apparent that it was her firm intention to re-establish the old relationship in which he was in pain and dependent on her.

The above reports suggest that a panacea has been discovered for all atypical pain syndromes. Unfortunately, that is not the case and electroshock therapy is not a cure-all. This treatment is not a solution for all pains; it is especially valueless for pain not of psychogenic origin. In fact, it may not even be the best psychiatric treatment for all psychogenic pains. Conceivably the best and most lasting results might be

achieved by a direct psychotherapeutic attack on the basic emotional conflict. This is not always feasible, however, because the patient may not be willing or a long psychotherapeutic course may be impossible. Further, narcotic addiction often complicates these problems, thus necessitating a more direct attack. However, something must still be done about the underlying emotional conflict because if nothing is done, the pain syndrome is apt to recur. If the patient is sent back to the same intolerable situation, he will probably utilize the same old mechanisms and solutions.

SUMMARY

Emphasis should be placed on the fact that electroshock therapy in atypical pain syndromes produces best results in those patients who are basically emotionally sound even though they are temporarily neurotically ill. Most success is attained when the underlying emotional conflict is correctible and especially when prominent depressive elements are present. It is least successful, except in the most transitory way, when there are prominent hysterical elements, a basically inadequate personality structure, or overpowering secondary advantages in remaining ill and in pain. Even though not a solution to all problems of atypical pain, electroshock therapy still may supply another useful therapeutic tool in properly selected patients.

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Current Literature on Pain

VENTILATORY ASPECTS OF POLIOMYELITIS, by

J. E. AFFELDT, C. R. COLLIER, M. G. CRANE, and A. F. FARR. *Anesth. & Analg.* 34:41-53, 1955.

"An anesthesiologist is a particularly valuable person to have on the local poliomyelitis team. His background of training, understanding of respiratory physiology and routine management of pulmonary ventilation are pertinent to the care of the acute and chronic respirator patient with poliomyelitis. His value to the team increases as he learns more about the underlying physiologic changes produced by this disease The big question facing the physician when using the respirator is what pressures and rate to use. This is in turn dependent upon the desired minute volume. The patient's respiratory center, although intact, cannot effectively control the minute volume when the respirator is being used. The depth and rate of breathing are determined by the per-

son setting the respirator, who has thus become the controlling center for that patient Unfortunately, too many respirators are still being empirically set at so-called average pressures, or being adjusted to the comfort of the patient, making no attempt to measure the ventilation being achieved. Within the past few years, the development and availability of a rapid infrared carbon dioxide analyser has provided an accurate, rapid and relatively simple means of analyzing the alveolar carbon dioxide concentration

"With such equipment we have made over 5,100 analyses in acute and over 2,126 analyses in chronic respiratory patients with poliomyelitis. Because of the relationship between alveolar ventilation and alveolar carbon dioxide . . . the alveolar carbon dioxide concentration is the best means of determining the ventila-

(Continued on page 28)

Editorial

USEFUL CONTROLLED AMNESIA

THE USEFULNESS of amnesia in medical practice has been apparent for one hundred years. Some physicians attempt to use hypnosis in the handling and treatment of their patients but usually are less successful than they hoped to be. Not all patients can be hypnotized, and the percentage of those who can be has been too small to make this a widely valued procedure.

Not much effort has been expended in attempting to produce amnesia with drugs. Yet, from the point of view of making anesthesia safer, it would be highly desirable if amnesia could be produced in most patients by use of small amounts of a drug. Many general surgical procedures could be done more safely with the patient under local or regional anesthesia than under general anesthesia if he did not subsequently object to the discomfort of the injections of the local anesthetic. For these individuals a period of amnesia would be beneficial. Many persons dread going to the dentist because often some discomfort is felt and, even though dental nerves are blocked, a few of the needle punctures are felt and remembered. For such individuals a drug that could be given, say intravenously, and that would eliminate the memory of the dental experience would be a decided advantage. A period of amnesia might be an advantage also in obstetric delivery if the right technic and the right drug could be found. The psychiatrists might find it useful in their visit with the patient and also perhaps in connection with electroshock therapy if a technic could be developed for successful interrogation. Of course, if this

procedure were perfected, interrogation probably would be useful in many other types of cases.

In a drug, such as Dolitrone (5-ethyl-6-phenylmetathiazine-2,4-dione), with which anesthesia may be produced with a full dose given intravenously, analgesia with a half dose given intravenously, and amnesia with a quarter dose given intravenously, we have a substance that prompts a suggestion that many of the agents in current use and probably many that have been discarded should be tried with the view of producing amnesia. If this effort could be initiated, results might prove worthwhile. Sometimes amnesia occurs spontaneously, and it would be interesting to know why this happens so that it perhaps might be brought about deliberately. Perhaps study of drugs that will produce amnesia and of the state of amnesia itself will yield this information. One explanation of why amnesic drugs have not been developed is that new preparations are almost always tried on laboratory animals which cannot talk.

If the amnesic potentialities of old drugs are to be reviewed and those of new ones determined, laboratory animals can be used for the toxicity studies but the drugs will have to be tried on people. This is not as radical as it may sound since any drug that produces amnesia probably will be given in very small doses. The study suggested sounds easy, but actually it is difficult to be sure that amnesia is present at the time of proposed use. Only subsequently can the patient report that he does not remember what happened.

The article, "Electroshock Therapy in Atypical Pain Syndromes," by Dr. David A. Boyd, Jr., in this issue is extremely interesting and presents a new idea which is timely.

JOHN S. LUNDY, M.D.

Book Reviews on Pain

ANESTHESIA IN OPHTHALMOLOGY, by WALTER S. ATKINSON, M.D., associate clinical professor of ophthalmology, New York University Post-Graduate Medical School, 1955. Springfield, Illinois: Charles C Thomas, 101 pages. Price \$3.25.

From the foreword: "The purpose of this monograph is to assemble and make easily available the generally accepted methods of producing anesthesia in ophthalmology. More emphasis is placed upon local anesthesia, since most eye operations can be done safely and painlessly with local anesthesia, which is administered by the ophthalmologist.

"For the administration of general anesthesia, a com-

petent anesthetist is essential. However, it is our duty as ophthalmologists to be sufficiently familiar with different types of general anesthesia which are best suited for eye operations so that we can intelligently confer with the anesthesiologist in order to select the best anesthetic procedure for each patient."

The author has achieved his objective, and he has emphasized his points by including some unusual cartoons which are amusing and at the same time strikingly attract attention to the point he wishes to stress. A number of drugs are discussed, particularly from the standpoints of their usefulness and the indications and contraindications in respect to their use in operations on

the eye. The barbiturates, chloral hydrate, morphine, and codeine are mentioned, and the important problem of nausea and vomiting is considered, as are means of overcoming it. The list of drugs which the author presents as useful against nausea and vomiting, however, is not complete.

Attention is given to topical anesthetic agents as well as various agents that can be used for infiltration and block anesthesia. He speaks well of hyaluronidase. Included is a table on the branches and sensory distribution of the ophthalmic and maxillary divisions of the trigeminal nerve. Some details are offered on akinesia of the orbicularis oculi muscles and more than one block technic designed to accomplish this is described, including the use of a local anesthetic agent and alcohol.

The technic of retrobulbar injections is well illustrated and given in sufficient detail—in respect to both an actual patient and the demonstration skull. Use of the bevel of the needle in subconjunctival injection is explained and emphasized, and a good diagram illustrates the difference between the action of eserine and that of pilocarpine. A section is included on curare and another on field block for anesthesia of the lids and also for operations on the lacrimal sac. The technic of all of these blocks is illustrated by photographs of a patient and also of the demonstration skull.

Anesthetic emergencies are described, and airways (oral and nasopharyngeal) are illustrated. Apparatus for use with oxygen is shown, as are endotracheal tubes and instruments used in ophthalmic procedures. There is a section on general anesthesia with Vinethene, nitrous oxide, and also one on Pentothal Sodium administered both intravenously and rectally.

The work has a considerable bibliography. The book is printed on good paper, is easily read, and is well indexed. It may not contain material which is new to ophthalmologists, but it is a book that should be in every medical library and should be looked over, in particular, by anesthesiologists.

JOHN S. LUNDY, M.D.

ELEMENTS OF PEDIATRIC ANESTHESIA, by C. R. STEPHEN, M.D., London, England; professor of anesthesiology, and chief, Division of Anesthesia, Duke University Hospital, Durham, North Carolina, 1954. Springfield, Illinois: Charles C Thomas, 109 pages. Price \$3.50.

The foreword of this book is by Wesley Bourne, who enjoys "toying" with words, and it is intriguing from the very first sentence. This then is the ideal introduction, and not only does the author mean what he says when he writes, "To be invited by a former student to write this foreword fills me with pardonable pride and fine feelings," but the fine feelings are also engendered in the reader and for this reason.

The book is written by a well-trained man who has been sufficiently successful to speak with authority on pediatric anesthesia. All the important factors are presented. Tables on volumes of blood to be used for transfusion at various ages under various conditions, tables on premedication and remarks on basal anesthesia are included, and a variety of techniques, equipment, and so forth, are considered and illustrated. These matters are important in dealing with infants and children. There is a table on the size of endotracheal tubes for various ages which, while not entirely original, could not be omitted.

The common anesthetic drugs are discussed briefly as well as some of the muscle relaxants. Naturally a discussion is included of anesthesia for various operations that are commonly performed on children. There is also a chapter on the treatment of asphyxia neonatorum which is always welcome, since each person who handles such a situation usually has his own particular way of doing things and has reasons for it. However, in one spot the author says in discussing complications during anesthesia in children: "Often it is due to a faulty technique being employed by the anesthetist." It seems reasonably certain that this statement should not have been included. The author should be able to find some other way to say what he has in mind without publishing a statement that may be used in court where it serves no good purpose. Statements of this sort might well be omitted from publications by medical men.

The paper on which the book is printed is good. It is easy to read, it well indexed, and should be popular.

JOHN S. LUNDY, M.D.

PAIN: ITS MECHANISMS AND NEUROSURGICAL CONTROL, by JAMES C. WHITE, M.D., chief of neurosurgical service, Massachusetts General Hospital; associate professor of surgery, Harvard Medical School, and WILLIAM H. SWEET, M.D., associate visiting neurosurgeon, Massachusetts General Hospital; associate clinical professor of surgery, Harvard Medical School, 1955. Springfield, Illinois: Charles C Thomas, 736 pages. Price \$17.50.

This book deals with the authors' personal experiences in treating some 400 patients suffering from persistent, severe pain which could only be relieved by surgery. The period embraces the fifteen years from 1935 through 1949. Dr. Stanley Cobb and Dr. Frances J. Bonner, two of the authors' associates, have helped in the treatment of these patients from the psychiatric point of view, and they have written the principal portion of the two chapters dealing with the psychologic aspects of pain and its modification by psychosurgery.

In the introduction, the history of knowledge about pain and the conduction of pain, as well as attempts to relieve it, is given briefly. The description is detailed, and is accompanied by illustrations which explain the anatomy of pain conduction from the various parts of the body. A chapter is devoted to the mechanisms of the conduction and perception of pain, and a section on the transmission of pain by peripheral and visceral nerves is included, with illustrations concerning the physiology involved.

Psychiatric considerations are dealt with in chapter 4. The rest of the book is devoted to surgical techniques and a discussion of diagnostic and therapeutic nerve blocks, with illustrations. In the latter procedure, the value of radiologic control in the placing of the needles is shown, as are x-ray pictures of opaque material injected from the needles to show the spread of the material. Blocks of the many cranial nerves are well described and illustrated. A chapter on peripheral neurectomy is well illustrated. In another chapter, posterior rhizotomy, sectioning of the spinal and cranial sensory roots, other cranial neurectomies, and medullary tractotomy of the descending trigeminal root are set forth and shown graphically.

Interruption of pain pathways in the spinal cord, medulla oblongata, and mesencephalon is dealt with in two chapters, one giving the operative steps and the other the results. Cerebral operations for relief of pain,

such as leukotomy (lobotomy), are presented, and the surgical steps are explained and depicted. Complications are dismissed and the benefits of the procedures are mentioned. A chapter follows on sympathectomy for visceral and causalgic pain, in which the surgical aspects and steps are discussed and illustrated.

The third portion of the book is concerned with neuralgias in which pain is the outstanding complaint. There is a chapter on neuralgias of the peripheral nerves, painful neuromas, amputation of stumps, phantom limbs, causalgia and posttraumatic dystrophy. The cases which illustrate these conditions are well chosen. In another chapter, the neuralgias of the peripheral nerves, such as painful surgical scars, intercostal neuralgia, meralgia paraesthetica, gangrene of digits, and degenerative arthritis of the hip, are presented. A chapter follows on facial and cephalic neuralgias: trigeminal neuralgia and trifacial neuralgia. Still another chapter discusses geniculate, glossopharyngeal and vagal neuralgias. A chapter is devoted to cephalic pain, particularly autonomic faciocephalgia (Horton's syndrome) and another is devoted to pain of spinal origin. Many illustrative cases are submitted to the reader. A section on herpetic pain is interesting. Pain arising from involvement of somatic nerves, as well as pain in disease of the thoracic viscera, is well set forth, accompanied by illustrations and specimen cases. Pain in abdominal visceral disease is accorded a separate chapter.

The bibliography is extensive. It should be of great value to anyone who is interested in the subject of pain and wishes guidance to additional sources. Both an author index and a subject index have been included. Physically, the book is very attractive. The paper is excellent; the text is easy to read and the illustrations are unusually good. Altogether, the book fills a distinct need, and will be of genuine service to anyone interested in the treatment of pain.

JOHN S. LUNDY, M.D.

OBSTETRICAL ANESTHESIA: ITS PRINCIPLES AND PRACTICE, by BERT B. HERSHENSON, M.D., director of anesthesia, Boston Lying-in Hospital; clinical associate in anesthesia, Harvard Medical School, 1955. Springfield, Illinois: Charles C Thomas, 403 pages. Price \$9.50.

The purpose of the author of this work is to set forth the selection of the anesthetic agent, the pharmacologic action and method of administration of the agent, and information about dealing with emergencies. Stress is laid upon cooperation between the obstetrician and the anesthetist. In view of the fact that relatively few anesthesiologists are especially trained to produce anesthesia for obstetric delivery, as compared to the number of obstetricians, this book is a very useful aid in certain cases. That is, the obstetrician who does not have all the facilities he needs or wishes can gain practical information from this book.

The author gives a brief historical background and then discusses reflex irritability and pain in labor. The chapter on premedication is adequate; the subject is of great importance. There is a chapter on the signs and stages of general anesthesia and another on respiratory and circulatory derangements, all of which are of great practical importance in the handling of obstetric patients. Asphyxia neonatorum is accorded another chapter; this subject likewise is, of course, most important. The subject of inhalation anesthesia is considered separately from

the chapter on local anesthetic agents. A chapter on complications completes the book.

This volume is well indexed and is printed on good paper. It is easily read, a quality which enhances the fact that the work is a very timely contribution to those who are concerned with the care of the obstetric patient.

JOHN S. LUNDY, M.D.

SADDLE BLOCK ANESTHESIA, by RAY T. PARMLEY, M.D., director, department of anesthesiology, St. Francis Hospital; staff anesthesiologist, St. Joseph and Wesley hospitals; consultant, Veterans Administration Hospital, Wichita, Kansas, 1955. Springfield, Illinois: Charles C Thomas, 59 pages. Price \$2.50.

This small book deals for the most part with a single subject, a treatment which makes the work valuable from the standpoint of simplicity. The details of carrying out low lumbar puncture to produce perineal anesthesia are described adequately. An occasional error by the author appears; most of them are not too important. A curious conflict between two plates is to be noted. In figure 5, depicting a cross section of the lower portion of the spinal canal, the dural sac is said to end at the second lumbar vertebra; whereas, on the next page, in figure 6 (another cross section), it is said that the spinal cord ends at the second lumbar vertebra and the dural sac at the second sacral vertebra. The latter statement is correct. The author is also somewhat in error as to why certain drugs are dispensed in solution instead of as crystals. The real reason for the use of the solution is that in such a form the drug can be sold at almost half the price it would cost if it were necessary to weigh every ampule and the crystals in it. The latter once was common, but it antedates the author's experience.

The most important part of the book is the discussion of the effect of block anesthesia on the uterus and the indications for such anesthesia and its contraindications. This alone is worth the price of the book. In addition, complications are adequately presented. Altogether, the physician who is practicing obstetrics would do well to read this book. The main "headache" in the induction of saddle block anesthesia is headache itself.

The book is printed on good paper, reads easily, is indexed, and has a modest list of references.

JOHN S. LUNDY, M.D.

HYPOTHERMIC ANESTHESIA, by ROBERT W. VIRTUE, M.D., associate professor and head of division of anesthesiology, University of Colorado School of Medicine, Denver, 1955. Springfield, Illinois: Charles C Thomas, 62 pages. Price \$2.50.

The author, because of his extensive experience with hypothermia in both laboratory animals and operative patients, is able to report first-hand observations on both, and to point out the advantages and disadvantages of the use of hypothermia for operations, particularly on the heart.

Since hypothermia is being used more and more, it is important that a book such as this be available. Those who plan to utilize the technic are thus enabled to commence by resorting to the information which will help to make the method safe.

The book is not indexed, but the 84 references provide the reader with sources which range from the year 1862 to the year 1954. This work is an excellent contribution to current technics in the operating room.

JOHN S. LUNDY, M.D.

CURRENT LITERATURE ON PAIN

(Continued from page 24)

tory status of a respirator patient The cuirass respirator consists of a portable pump and a shell which covers the anterior and lateral portions of the thorax and part of the abdomen to form a pressure chamber similar in the principle to that of the tank respirator, except for its size and coverage. At the present time there are basically two shell designs commercially available. One covers the chest and part of the upper abdomen, known as the chest cuirass. The other covers the chest and entire abdomen, known as the chest-abdomen cuirass. Neither have the ventilating capacity of the tank respirator, measuring 47 per cent and 61 per cent as efficient. These cuirass respirators carry the distinct advantage of allowing freedom of motion and accessibility of the extremities and portability. The rocking bed, which is a motorized version of the Eve rocking method for artificial respiration, has also received extensive use in the chronic phase of poliomyelitis. Its efficiency is related to the angle of inclination used It should be noted that the ability of such equipment to ventilate a patient is unrelated to the extent of his muscle paralysis or vital capacity, but is related to the portion of the body covered, pressures or angles used, lung compliance and resistance of the airway to airflow The development of a substitute breathing technique, glossopharyngeal breathing, has been an important step in the rehabilitation of the severely involved chronic respirator patient. The patient uses his tongue as a pump, forcing approximately 70 cc. increments of air into the lungs The ventilator defects present in acute and chronic respiratory poliomyelitis include the respiratory center, obstructed airway, pulmonary subdivisions, pulmonary compliance changes, and an increased alveolar-arterial oxygen difference."

From LUNDY, J. S., and MCQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1954, Vol. 41. Copyright by J. S. LUNDY.

A COMPARISON OF THE ANTI-EMETIC EFFECTS OF DIMENHYDRINATE, PROMETHAZINE HYDROCHLORIDE AND CHLORPROMAZINE FOLLOWING ANESTHESIA, by DOREEN CAPLIN and CODE SMITH. *Canad. Anaesthetists' Soc. J.* 2:191-197, 1955.

"Dimenhydrinate, promethazine hydrochloride, and chlorpromazine have all been recommended as effective anti-emetic drugs. A comparison of the clinical efficacy of these three agents was made with a carefully selected and controlled group of patients. A group of patients undergoing operation for correction of squint was chosen for this study The first comparison was made between 40 cases treated with dimenhydrinate and 40 untreated controls. Towards the completion of this series, optimistic reports of the effectiveness of promethazine hydrochloride and chlorpromazine prompted us to conduct a second series consisting of 20 cases treated with promethazine hydrochloride, 25 cases treated with chlorpromazine and 20 untreated controls.

"Chlorpromazine reduced the incidence of vomiters to a significant degree, reduced the frequency of vomiting in cases that did vomit, produced only a slight prolongation in the time of recovery from anesthesia, and did not decrease the average fluid intake. Dimenhydrinate reduced the incidence of vomiters and frequency of vomiting to a less marked degree than chlorpromazine, produced a somewhat more prolonged recovery time than

chlorpromazine, and did not decrease fluid intake. Promethazine hydrochloride did not significantly decrease the incidence of cases of vomiting postoperatively, although the frequency of vomiting was decreased. Recovery time was more prolonged than with either of the other drugs and the fluid intake was slightly reduced. We conclude that, of the three drugs investigated, chlorpromazine is the most effective anti-emetic drug with a minimum of side-effects in children undergoing operation for the correction of squint."

From LUNDY, J. S., and MCQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1954, Vol. 41. Copyright by J. S. LUNDY.

RESUSCITATION OF THE NEWBORN INFANT: A PRELIMINARY CLINICAL REPORT ON THE USE OF A DETERGENT AND A SPREADING FACTOR AS AIDS IN PULMONARY EXPANSION, by ALLAN BLOXSOM. *Anesthesiology* 16: 42-47, 1955.

"Gruenwald in 1947 stated that the resistance of aeration in the atelectatic lung of the newborn infant is attributable to surface tension which counteracts the entrance of air, and that surface active substances reduce the pressure necessary for aeration. Postmortem studies on atelectatic lungs of newborn infants treated with saline solution and amyl acetate before the introduction of air for expansion showed a marked reduction in pressure necessary for the introduction of air, and aeration was more diffuse than usual. It was thought that such an observation indicated that there might be more than just surface tension which counteracts the entrance of air, and that possibly a cell cementing substance such as hyaluronic acid found normally between cells of the body may be present as an inhibitor to the expansion of some atelectatic alveoli. With the recent favorable reports of Miller and Ravenel on the use of a nontoxic detergent (alevaire) in pulmonary therapy, further study is now possible on the employment of such a detergent both as a primary agent and as a vehicle for aerolization of a spreading factor such as hyaluronidase in the treatment of the atelectatic lungs of the handicapped newborn infant. This preliminary report is based on the treatment of a group of infants showing symptoms of atelectasis and hyaline membrane disease with a nontoxic detergent (alevaire) and a spreading factor hyaluronidase (alidase)

"Meyer and Palmer have demonstrated that there exists in the umbilical cord a free, polysaccharide acid of high molecular weight which they named hyaluronic acid. The reason for this concentration in the umbilical cord is not known. It is possible that the degree of concentration of hyaluronic acid in the umbilical cord may be an effective barrier to the expansion of the alveoli of infants after delivery by providing a strong cementing or mortar-like action of this substance between the alveolar cells of the lungs of the fetus. It is proposed now to study the cords of different newborn infants, particularly those showing difficulty in expansion, to determine whether there is any correlation between this difficulty and the content of the hyaluronic acid in the cords of such infants. The nursing personnel have commented upon the rapidity with which the condition of infants processed in a nebulizing chamber with a detergent such as alevaire in combination with a spreading factor such as alidase becomes 'good' and the infants can be transferred from such a chamber to an incubator in comparison with those processed only with a mist of water. Clinically, there appears to be quite a contrast. A detergent

such as that described by Miller, and later by Ravcnel for nebulization provides an ideal vehicle for a spreading factor such as hyaluronidase (alidase) to allow the detergent the greatest possible coverage in the atelectatic lung. The clinical results in this study bear out this possibility. Laboratory studies on the lungs of newborn infants processed with alevaïre and alidase will be made and reported. The detergent alevaïre is composed of 5 per cent glycerine, 2 per cent sodium bicarbonate, and 0.125 per cent alkylaryl polyether alcohol of the oxyethylate tertiary oxyphenol-formaldehyde polymer."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1954, Vol. 41. Copyright by J. S. LUNDY.

SURGERY IN THE AGED, by F. A. COLLIER and R. P. DOBBIE. *Geriatrics* 9:303-310, 1954.

"The aging process creates profound physiologic changes in all individuals but only the degree and extent of these changes can be considered in evaluating a patient for surgery. Our limitations must be those based only on physiologic rather than chronologic age. . . . It is generally accepted that the skill and judgment of the anesthetist is of much greater importance than any agent or technic. We can only speak from the viewpoint of the surgeon. In general, the aged patient requires less anesthetic for a given procedure than does a vigorous young person. The choice should be based on the total physiologic status of the patient, concurrent disease, type of operation, and desired effect without regard to age. Preoperatively, unless there is pain, it is wise to avoid the use of morphine or other narcotics, or, if sedation is indicated, to use an intramuscular barbiturate (90 mg. pentobarbital sodium one hour preoperatively in a normal adult). Agents which limit the oxygen supply, such as nitrous oxide or ethylene, should not be used except for brief periods of induction. Cyclopropane alone often does not give sufficient relaxation and is dangerous when the heart is irritable. It should be remembered that over digitalization may lead to heart block or significantly increased irritability of the heart. Quinidine is often useful when dealing with irritable hearts. Pentothal, like all barbiturates, depresses cardiac muscle and should be avoided as the sole or predominant anesthetic agent. Occasional exceptions can be made to quiet an apprehensive patient and superimpose sleep, in cases in which the burden of anesthesia is carried by another agent, but the total dose of Pentothal should be kept small and not in excess of 0.5 gm. The use of spinal anesthesia has been much debated, yet our experience has shown it useful, desirable, and safe for operation on the bladder, prostate, and lower extremities, particularly in amputations in which the spinal anesthesia has been limited to one leg by positioning

"Cryotherapy (refrigeration anesthesia) has been popular in some clinics but has the disadvantage of requiring a tight tourniquet at or above the amputation site, which is often detrimental to wound healing in an area already deficient in arterial blood supply. Anoxia and thermal injuries from such anesthesia appear to account for a 53 per cent wound breakdown. Despite these disadvantages, this technic may be lifesaving in some instances. For major procedures in which muscular relaxation is required, we prefer ether because it provides good relaxation and permits adequate oxygenation When the apparatus is coupled with an endotracheal

tube, the anesthetist can deepen the anesthesia as needed, allowing the patient to be carried at a light level. The ether will be largely eliminated through the endotracheal tube by the end of the operation, and tracheobronchial secretions can be easily removed during and at the conclusion of the procedure. These features are particularly desirable in the aged."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1954, Vol. 40. Copyright by J. S. LUNDY.

PYRIBENZAMINE: EVALUATION OF EFFECTIVENESS AS AN ANALGESIC AGENT IN REGIONAL ANESTHESIA, by A. M. BETCHER and Z. T. TANG. *Anesthesiology* 16:214-223, 1955.

"The introduction of antihistamine for regional anesthesia is warranted if they possess advantages over those known anesthetic agents usually employed. In addition, they should lack the undesirable side effects of the conventional agents. Both laboratory and clinical research must prove their superiority. It is proposed in this preliminary report to revise the pharmacology and laboratory reports and to present our observations in a series of cases in which the specific antihistamine, pyribenzamine, was used in local and regional anesthesia for surgical procedures and in diagnostic and therapeutic nerve blocking Pyribenzamine solution, 1 per cent, alone or with epinephrine, 1:100,000, was used in intradermal wheal testing on 30 human volunteers, 329 diagnostic and therapeutic nerve blocks, local infiltration for 100 surgical procedures and regional nerve block for 30 surgical procedures. Its rapid onset of action, longer duration of action, high percentage of success and low incidence of reactions of the central nervous system indicate its suitability as an anesthetic agent. The observation locally of occasional burning, bleeding, erythema and oozing may be disadvantageous to the common usage of pyribenzamine. Pyribenzamine, 1 per cent, is apparently more potent and relatively less toxic than an equivalent dose of 1 per cent procaine."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1954, Vol. 41. Copyright by J. S. LUNDY.

PREOPERATIVE SEDATION WITH NISENTIL, by STANTON BELINKOFF. *Anesth. & Analg.* 34:116-118, 1955.

"Following our extensive use of Nisentil as an analgesic agent for painful burn dressings and as an intravenous anesthetic agent combined with nitrous oxide and oxygen, it was decided to evaluate its use as part of the routine preoperative sedation of surgical patients. Certain desirable features such as lack of nausea and vomiting, rapidity of onset of action, and minimal respiratory depression in doses which provide adequate analgesia, and euphoria indicated that it would prove satisfactory in this respect When used with pentobarbital 0.1 gm. (gr. 1½) orally about two hours preoperatively, and then Nisentil 60 mg. with scopolamine 0.00032 gm. (gr. 1/200) ten minutes preoperatively by hypodermic injection, it has proven very satisfactory, and in our series of cases, better than the other techniques we had been using on our patients."

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REFERENCES:

1. J.A.M.A. 159:645 (Oct. 15) 1955.
2. J.A.M.A. 158:386 (June 4) 1955.



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Ascha Bean, M.D., Vassar College; Mrs. Raidie McDinger, R.N., Roosevelt College; Mrs. Ruby R. Bugar, Occidental College; Frances McCormick, R.N., Cornell University.

John P. Monks, M.D., Harvard University, and William Lester, M.D., Chicago, should be deleted from the membership list of the Committee on Research. Dr. Lester, as noted above, is no longer in the field of college health work. Dr. John W. Brown also has asked to be dropped from this committee. Glen Leymaster, M.D., University of Utah, has been added to the committee by John Summerskill, Cornell University, chairman.

The announcement of Dr. Norman S. Moore, Cornell University, as chairman of the Special Committee to Study the Financial Structure of the American College Health Association, was in error.

News Briefs . . .

North Dakota

DRS. WILLIAM O. WEBSTER, Fargo; ROBERT D. SCHOREGGE, Bismarck; and DAVID B. HORNER, Minot, were inducted recently as fellows of the American College of Surgeons. The ceremony of induction closed the five-day clinical congress of the organization held in Chicago. Fellowship is awarded on the basis of acceptable medical education, advanced training as a specialist in one of the branches of surgery, and ethical practice.

DR. LEONARD W. LARSON, of Bismarck, is president of the newly-formed Joint Blood Council which has its national headquarters in Washington, D. C. A completely voluntary group, the council is composed of the American Association of Blood Banks, American National Red Cross, American Medical Association, American Hospital Association, and American Society of Clinical Pathologists. The new nonprofit organization is concerned principally with procuring, processing, preserving, and distributing blood and blood derivatives. Its objective is to coordinate all activities in this field.

Minnesota

A MILLION-DOLLAR drive for funds for a Masonic Memorial Cancer Hospital has been launched by more than 68,000 Minnesota Masons. The hospital, to be located near the Mayo Memorial and Variety Club Heart institutions on the University of Minnesota campus, will care primarily for those suffering with advanced stages of cancer. Dr. Howard S. Diehl, dean of medical sciences at the university, called plans for the 50-bed hospital "one of the most humanitarian enterprises that has ever come to my attention."

DR. IRVINE MCQUARRIE, professor and former head of pediatrics at the University of Minnesota, was named Minnesota representative on a committee to raise a memorial fund of \$150,000 in the name of the late Dr. T. Duckett Jones. The fund's income will be used to support outstanding scientists in investigating rheumatic fever and rheumatic heart disease. Dr. Jones was an authority in this field, and was medical director of the Helen Hay Whitney Foundation prior to his death.

THE NORTH CENTRAL MEDICAL CONFERENCE was held this year in St. Paul, November 20, 1955. Economic trends in medicine was the topic discussed. Dr. George Earl of St. Paul was president of this year's conference. Dr. Philip H. Woutat of Grand Forks, North Dakota, has

been chosen president for the conference in 1956.

Physicians from North Dakota who attended were: W. H. Gilsdorf, Valley City; C. J. Baumgartner, Bismarck; Willard Knight, Williston; Philip H. Woutat, Grand Forks; Keith G. Vandergon, Portland; Joseph Sorkness, Jamestown; O. A. Sedlak, Fargo; Charles F. Schneck, Harvey; R. W. Rodgers, Dickinson; Ralph E. Mahowald, Grand Forks; W. E. G. Lancaster, Fargo; Ted Keller, Rugby; Alan K. Johnson, Williston; D. J. Halliday, Kenmare; and Mr. Lyle A. Limond, Bismarck, executive secretary, North Dakota State Medical Association.

Physicians from South Dakota who attended were: H. Russell Brown, Watertown; F. D. Gillis, Mitchell; R. G. Mayer, Aberdeen; A. W. Spiry, Mobridge; Alonzo P. Peeke, Volga; R. A. Buchanan, Huron; Donald H. Breit, Sioux Falls; and Mr. John Foster, Sioux Falls, executive secretary of the South Dakota State Medical Association.

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THE MINNESOTA HEART ASSOCIATION recently presented Dr. Harold S. Diehl, dean of medical sciences at the University of Minnesota, a check for \$46,664. The sum is the final installment of a \$99,664 grant for heart research at the university for 1955 and 1956.

• • • •

DR. HARRY B. ZIMMERMAN, well-known St. Paul surgeon and retired chief of Miller Hospital's medical staff, was recently honored by 100 of his colleagues. A memorial plaque was presented to him which is to be mounted on the new Harry B. Zimmerman wing of Miller Hospital. A silver plate inscribed to Dr. Zimmerman from his medical associates was given to him and Mrs. Zimmerman. Dr. Zimmerman, who began his medical career in 1911, is emeritus clinical professor of surgery at the University of Minnesota.

• • • •

DR. NELLIE O. BARNES, a general practitioner and specialist in diseases of the eye, ear, nose, and throat, has been named "Medical Woman of the Year" by the Minnesota Branch of the American Medical Women's Association. One of the first women physicians in Minnesota, Dr. Barnes was cited for meritorious service to the people of her community for more than fifty years.

• • • •

DR. WALTMAN WALTERS, head of a section of surgery in the Mayo Clinic and professor of surgery in the Mayo Foundation, has been advanced to grade of rear admiral in the United States Naval Reserve. Dr. Walters is the third member of the Mayo Clinic staff to receive this grade. The other physicians were Dr. W. McK. Craig and Dr. T. B. Magath.

• • • •

DR. J. ARNOLD BARGEN, head of a section of medicine at the Mayo Clinic and professor of medicine in the Mayo Foundation, was elected president of the staff of the Mayo Clinic for the forthcoming year at the annual meeting of the staff. Dr. Winchell McK. Craig was elected vice president and Dr. David G. Pugh was re-elected secretary. Councillors are Drs. Kendall B. Corbin and Laurentius O. Underdahl.

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DR. EDGAR V. ALLEN, a member of the Mayo Clinic staff and professor of medicine in the Mayo Foundation, has been named president-elect of the American Heart Association.

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DR. JOHN H. REITMANN has resigned as superintendent of the Anoka State Hospital to take further training under the state's psychiatric residency training program. After completion of his residence training at the University of Cincinnati, Dr. Reitmann will return to the state hospital system.

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South Dakota

DR. R. A. BUCHANAN, Huron physician and surgeon, has been named South Dakota's "General Practitioner for 1956" by the South Dakota Medical Association. Dr. Buchanan's nomination is eligible for consideration for national honors by the American Medical Association.

DR. MAGNI DAVIDSON and DR. ROBERT HENRY, of Brookings, were awarded fellowships in the American College of Surgeons at the recent convention in Chicago. The fellowships were awarded for their training and practice in surgery.

DR. C. F. MORSMAN, of Hot Springs, who established the Frank Morsman Medical Foundation, is now co-sponsor of another medical foundation, namely, Endocrinology for General Physicians.

Deaths . . .

DR. A. D. STROM, Chief of Staff at Mercy and St. Mary's hospitals in Langdon, North Dakota since 1953, died of a heart attack November 23.

DR. RALPH H. CREIGHTON, 57, Minneapolis physician and chief of staff at Abbott Hospital, died November 11 of a heart attack. Dr. Creighton was a past president of the Hennepin County Medical Society.

DR. WALTER J. MARCLEY, 88, a pioneer in the study and treatment of tuberculosis and reportedly the first person enrolled at the University of North Dakota, died November 8 at his home in Minneapolis. Dr. Marcley was one of the founders of the National Tuberculosis Association and head of several sanatoriums during his lifetime.

Advertisers' Announcements

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The effectiveness of the antibiotic Erythromycin is drastically increased when combined with triple sulfa drugs. The combination, used in treating patients with gonorrhea, was responsible for cures in 92 per cent of patients.

Drs. Milton Marnell, Boris Shidlovsky, and Aaron Prigot of Harlem Hospital, New York City, treated 140 cases of gonorrhea with various mixtures of Erythromycin and sulfa to determine the best combination. It was found that 2 gm. of Erythromycin and 3 gm. of sulfonamides produced the highest cure rate of 92.3 per cent. Previous studies show that Erythromycin alone produces from 58 to 80 per cent cures. "Toxic reactions in 140 treated patients were minimal," the physicians report. Of the 47 patients receiving the optimum dosage, only 1 suffered from nausea.

The drug used was Erythrosulfa produced by The Upjohn Company, Kalamazoo, Michigan, and was given orally.

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Pen-Vee Oral (Tablets), made by Wyeth Laboratories, Philadelphia, is a new type of oral penicillin highly resistant to destruction by the acids of the stomach and readily absorbed by the blood stream. The drug is most effective in the management of streptococcal, susceptible staphylococcal, pneumococcal, and gonococcal infections. It is also effective in the prevention of recurrent attacks of rheumatic fever. In secondary infections, it may be used to prevent bacterial endocarditis after tonsillectomy and tooth extractions in cases with a history of rheumatic fever; in rheumatic and congenital heart disease;

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Presented with a specially designed "drop-control" device for greater convenience of administration, Thiosulfil solution for ophthalmic and nasal instillation has just been released, Ayerst Laboratories, New York City, announces. Thiosulfil solution is clinically effective against the common pathogenic invaders of the conjunctivae, nasal passages, and accessory sinuses. Thiosulfil solution is nonirritating; produces a local effect with minimum systemic absorption; is virtually free from the risk of sensitization; requires no refrigeration; and contains no vasoconstrictor. Thiosulfil solution, brand of sulfamethylthiadiazole, is supplied in ½-oz. bottles.

ROBINS COMPANY AWARDS GRANT

Alfred J. Vignec, M.D., medical director of the New York Foundling Hospital, has received a grant from A. H. Robins Co., Inc., Richmond, Virginia, to aid in investigating the use of Donnatal Plus Elixir in the treatment of hyperactive children presenting various nutritional and behavior problems. Infants and children in the Foundling Hospital and at St. Agatha's Home, Nanuet, New York, will be studied. Aiding Dr. Vignec in the project are Dr. Juan F. Julia of the Foundling Hospital, and Dr. August Moser and Miss Marian Gentile of St. Agatha's Home.

RESPIRATORY INFECTIONS DANGEROUS IN CARDIAC DISEASE

The question, "How important are respiratory infections as a cause of heart failure?" is examined in recently published papers reviewed in a publication distributed by Lakeside Laboratories, Inc., Milwaukee, Wisconsin. Respiratory infections, particularly colds, apparently are the most common irritating and aggravating factors in congestive heart failure.

In a study of more than 300 cases of heart failure, a British medical investigator found more than half with some type of respiratory infection. It was established that the infection was the precipitating cause of decompensation in 156 of the 300 cases. In a similar study conducted by 3 investigators, direct relation was found between the frequent occurrence of heart failure among cardiac patients and onset of "even minor colds."

The British investigator, Dr. F. J. Flint, believes respiratory infection in the person with a weak heart may initiate cardiac failure by causing damage to the heart muscle or by favoring congestion of the lungs.

LEVOPHED INCREASES CORONARY BLOOD FLOW

In treating myocardial infarction, the pressor agent Levophed (norepinephrine) increases coronary blood flow in much greater proportion than the rise in blood pressure. After administration of Levophed, a rise in the oxygen content of coronary venous blood is observed. The blood is found to be bright red, whereas after methoxamine it remains black. This furnishes direct evidence that the oxygen supply of the heart muscle is increased to a greater extent than oxygen utilization. The conclusion is that Levophed is a potent coronary vasodilator and produces an increase in coronary blood flow far in excess of its effect in elevating the blood pressure.

Levophed is manufactured by Winthrop-Stearns, Inc., New York City.

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COMING in *March* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- "The Industrial Back" by Russell I. London, M.D., of Philadelphia, compares the workman's back to a mechanical apparatus. The ways in which a mechanical advantage can be created are discussed. Emphasis is placed on the proper use and protection of the workman's back in industry. The majority of back injuries are simple low-back sprains, and treatment embodying the principles of cold, rest, and supports is outlined. Such simple management shortly after injury occurs prevents much distress and loss of time.

- Among the topics discussed in "Infant Feeding at the Mid-century" by Lee Forrest Hill, M.D., of Des Moines, Iowa, are the factors contributing to the decline of breast feeding during the last fifty years. This decline is deplored and a program is suggested which might serve to reverse the trend. The historic achievements leading to the present successful status of artificial feeding are reviewed. A concept of the essentially unsolved and unchanged problem of colic is presented.

- Many new technics have supplemented and occasionally replaced older methods in the diagnosis of pulmonary disease. In the past, disease could be detected only after the major pulmonary lobes had become involved. Secondary and sometimes tertiary bronchi are now within diagnostic range, and detection of disease in these areas often constitutes a diagnostic triumph. Jerome A. Hilger, M.D., of St. Paul, Minnesota, outlines a plan of diagnosis in "Bronchologic Methods in Pulmonary Diagnosis" which places in orderly sequence and proper relationship both the new procedures in use today and the old methods which still remain the basic requisites of pulmonary diagnosis.

- In *LANCET Clinical Reviews*, a case of a patient with "Hypertension and Unilateral Renal Disease" is reported by M. P. Reiser, M.D., and C. D. Creevy, M.D., of the division of urology in the department of surgery at the University of Minnesota. In this case, two and one-half years after nephrectomy, no episodes of cardiac failure had occurred, electrocardiograms were normal, and retinal hemorrhages had disappeared. Nephrectomy is contraindicated in many instances of hypertension, and an improper selection of patients often accounts for the low percentage of cures.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA POSTGRADUATE COURSES

A course in Dietetics for Dietitians will be presented March 1 to 3. Recent advances in the field will be stressed. Miss Angeline D. Mannick, director of Nutrition and associate professor of Dietetics, will direct the course.

A course in Pediatrics for General Physicians will be held March 5 to 7. Guest faculty will include Dr. Katharine Dodd, professor of Pediatrics, University of Arkansas School of Medicine. Dr. Dodd will also deliver the Phi Delta Epsilon Lecture on March 6. The course will be presented under direction of Dr. John A. Anderson, professor and head, Department of Pediatrics.

A course in Cardiovascular Disease for General Physicians will be given March 19 to 21. Emphasis will be placed on management of cardiovascular disorders most often encountered. Dr. Hans Hecht, associate professor of medicine, University of Utah College of Medicine, will be guest speaker. Dr. C. J. Watson, professor and head, Department of Medicine, will direct the course.

SECTIONAL MEETING

Handling of mass casualties will be one of the important subjects discussed at the sectional meeting of the American College of Surgeons during the 3-day meeting in Milwaukee, February 27 through 29, at the Hotel Schroeder. All physicians are invited to attend.

CLINICAL REVIEWS

A 3-day program entitled "Clinical Reviews" will be held at Rochester, Minnesota, April 9 through 12. Presentations will be given by staff members of the Mayo Clinic and Mayo Foundation. Lectures and discussions will cover problems of current interest in general medicine and surgery. There are no fees. Accommodations are limited. Those wishing to attend should communicate with Mr. R. C. Roesler, Mayo Clinic.

The Journal Lancer

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Mechanism of Abdominal Pain

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I APPRECIATE the honor of being asked to participate in this lecture series sponsored by THE JOURNAL-LANCET. Since I am not a neuroanatomist, I am sure many of you wonder why I have the temerity to choose a topic of this type for discussion tonight. Actually I am going to try to present a clinician's concept of the mechanisms of abdominal pain. These mechanisms are complex and not entirely understood. Nevertheless, it is important for the diagnostician, whether surgeon or internist, to formulate early in his career a tentative schematic outline of possible pain mechanisms. These can be applied to each new patient problem. Expert clinicians and diagnosticians are usually those who keep alert through the years to possible pain mechanisms.

The philosophic concept of pain has undergone considerable change in recent years. Formerly pain was discussed as nothing more than a perception of a noxious stimulus. Now pain is spoken of as an experience, comprising not only the perception of a noxious stimulus but the results of that perception in terms of secondary physiologic and psychologic reactions and their consequences. This matter of pain and its effect on the patient is a comprehensive syndrome. The significance of many pains is not easy for the young physician to appraise correctly. My experience in training young physicians has been that those physicians who develop early in their career an interest in attempt-

ing to understand the mechanism of a given complaint become the better diagnosticians. Those who are most interested in machines and technical gadgets become narrow and less efficient diagnosticians. So I try to interest young physicians in carefully analyzing subjective complaints and in attempting to explain their mechanism. The most important of these is pain.

TWO PHILOSOPHIC CONCEPTS OF PAIN

In thinking of pain, two philosophic concepts should be kept in mind. The first is the concept emphasized by Hilton: "Every pain has its distinct and pregnant significance if we will but carefully search for it." In this sense, pain is beneficent. It is a warning signal that brings the patient to the physician. Sherrington described it as the "psychic adjunct of an imperative protective reflex." With this concept in mind, it should be mentioned that the clinician who is well trained in the interpretation of abdominal pain has at hand the most important single diagnostic aid in gastroenterologic diagnosis. Well over 50 per cent of patients who come to the gastroenterologist have functional disorders. Their presenting complaints must be carefully analyzed and appraised in relation to environmental, situational, and personality factors. This concept that pain is protective has great importance, since often when pain first appears it can be looked upon as a final warning signal of disaster. Unfortunately, in some organic diseases, actual severe tissue destruction has taken place

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JOURNAL-LANCET Lecture presented at the University of Minnesota, December 1, 1955.

before the perception of pain is first noticed.

Another idea to remember about the protective value of pain is that sometimes the warning signal is absent. A few persons have been born without pain perception. However, such cases are rare. I have never seen a person incapable of feeling pain who did not have a disease involving pain pathways. Some well-known diseases of the central nervous system make it impossible for persons so afflicted to appreciate pain. Unfortunately, doctors perform some operations which may interfere with the registration of pain and actually do away with the warning signal. Some of our surgical friends occasionally find a sympathectomy necessary for hypertension. Pain stimuli carried over afferent visceral nerve pathways from viscera in the neural segment which have been interrupted by operation cannot gain access to higher centers, and visceral pain from those viscera may no longer be experienced. After splanchnicectomy, a duodenal ulcer has been known to perforate without any warning pain sensation until the pain of generalized peritonitis (impulses carried over cerebrospinal nerves) appears.

I mentioned this afternoon the pain-relieving value of large doses of anticholinergic drugs, which sometimes dull the sensations produced by a deeply penetrating peptic ulcer, so that the patient is not conscious of a complication developing. The beneficent warning signal of pain may be lacking under many different circumstances. There are some organs that do not have naked nerve endings capable of registering pain stimuli. The center of solid organs, such as the liver and spleen and, to a lesser extent, perhaps the pancreas, are not equipped to register pain stimuli until the capsule of the organ either is invaded by the disease process or becomes stretched. So much for this first concept of pain, that is, the concept that pain is a warning signal, whether arising in the environment causing a skin stimulus or arising in the interior of the body as a result of a functional or an organic derangement (true visceral stimulus).

The second concept to keep in mind is that pain isn't always beneficent. In this connection, the quotation of René Leriche may come to mind: "The only pain that is easy to bear is the pain of others." Every pain, sooner or later, may become deleterious, may be destructive, and may create secondary symptoms and even secondary diseases. Always, when this concept of pain occurs to me, I am reminded of that truly great figure in American medicine, Silas Weir Mitchell. He happened to be a Philadelphian, a friend of Oliver Wendell Holmes, a poet, and a novelist—

the author of *Hugh Winn* and *Constance Trescott*—two of the best sellers of the day. This man was a neurologist. He, with W. W. Keen and G. R. Morehouse, supervised patient care in Turner's Lane Hospital in Philadelphia, set up by Surgeon General Hammond during the war between the states to care for nervous diseases and nerve injuries. As a result of that experience, Mitchell wrote his monograph on peripheral nerve injuries and described two conditions, which, I think, had not been described before or were little understood prior to his contributions. These were the phantom limb pain and causalgia. The latter, a burning pain, is associated with stretched shiny skin and with secondary tissue damage, together with secondary pain sensations often distributed over a wide area. Mitchell was among the first to draw attention to the fact that actual pain can become a disease, as is the case in causalgia, and that it must be treated as a disease in such cases, not merely as a symptom. All of this serves to emphasize the fact that pain does exert deleterious effects on the body and the mind in addition to being a disagreeable experience.

Experimental evidence is now at hand to support this thesis. Head screw tantalizers produce pain which is capable of causing rather striking changes in an electrocardiographic tracing in patients who have coronary artery disease. A pain stimulus, if severe enough, may reduce blood flow through the afferent and efferent arterioles of the glomerulus of the kidney. Perception of pain, experimentally produced, is associated at times with sharp rises in blood pressure. A given pain stimulus in the abdomen may set up secondary stimuli, causing a striking degree of motor dysfunction in the alimentary tract far away from the site of the original stimulus. Furthermore, a pain stimulus may give rise to spasm in a voluntary group of muscles in the same neural segment in which a stimulus is being applied to a viscus. Pain arising from the secondary muscle spasms may become more severe than the initial visceral pain, so that the primary pain is forgotten.

From the foregoing brief outline of the deleterious effect of pain and of the reactive phenomenon with which it is associated, the fact is readily seen that pain isn't really quite as simple as many people believe. The feeling is much more than the simple perception of a stimulus. It is an experience which can cause secondary pains, secondary physiologic disorders, and perhaps secondary diseases. All of this serves to stress again the difficulties experienced by clinicians in appraising the significance of a given

pain. It should also emphasize that pain relief has great importance, not only for comfort, but to avoid the occurrence of secondary deleterious effects.

APPRAISAL OF PAIN SIGNIFICANCE

Let us consider in more detail the complexities involved in any attempt to appraise the significance of a given pain. Ordinarily both pain perception and the patient's secondary reactions to pain, physiologic and psychic, must be kept in mind. Our first concern is pain perception or pain threshold. A number of methods have been employed to measure pain threshold. Several investigators have perfected a test, utilizing radiant heat applied to the uninflamed skin of the forehead. The intensity of radiation, which barely evokes pain, is denoted pain threshold. This represents an appreciation of the minimum stimulus capable of being perceived. For practical purposes, appreciation of pain comprises a much more complex mechanism. We must accept the patient's word when he describes the character and intensity of pain. We realize that in its appraisal we not only are obliged to take into consideration the description given by the patient, but must form some idea of his reaction to pain. The pain in itself, as has been mentioned, may set up various side reactions, emotional and somatic, which taken together make the appraisal of pain exceedingly difficult at times. Furthermore, the pain threshold can be altered. The threshold can be raised by distracting the patient, for example, by clanging a bell in his ear or by having his mind intently concentrated on reading something in which he is keenly interested. Pain threshold can be raised by hypnosis or by suggestion or by stimulating the sympathetic nerve pathways with, perhaps, an injection of epinephrine. Perhaps the pain threshold-raising effect of an injection of epinephrine is the reason why pugilists do not feel keenly many hard blows and why soldiers who are injured do not seem to perceive pain to the extent that would be imagined considering the nature of their injuries. This is nature's way of protecting us against intolerable pain.

Many factors may lower pain threshold. It can be lowered by apprehension or anticipation. A pain that returns every half hour with regularity is anticipated sooner or later and may seem more severe with each subsequent episode. "Conditioning" may also lower pain threshold. A pain which recurs in relation to some physiologic function or cycle may, after repeated recurrences, seem more intolerable and is often more easily localized. Perhaps the most practical thing

to remember about pain threshold is that inflammation of a part always increases the appreciation of a stimulus applied to that part. This will be mentioned later.

We have already referred to the great differences which are seen in different patients in their apparent reaction to the pain stimulus. This can be appreciated to some extent during the routine examination of the patient. Reactivity, whether physiologic or psychologic, is unquestionably modified by the emotional state of the patient. Mood and attitude determine in a large measure the effect of the pain stimulus on the patient. Does it by association of ideas constitute a threat to individual security based on past-life experiences and knowledge? If so, then various reactive phenomena may cause the physician to believe that the pain stimulus per se is more severe than it actually is.

Finally, in attempting to appraise the significance of pain, another possibility must be considered. Is this person actually experiencing pain at all? Is the patient malingering? Does he have a reason for wishing to be ill or to appear ill? Is the apparent illness profiting this person? Is it an escape mechanism releasing him from some disagreeable duty? Has the illness become a way of life, a reward, or a method of getting sympathy and attention?

Another psychologic disorder, which may strikingly influence pain sensibility, is depression. This must always be considered in the person who has constant discomfort in the absence of organic disease. And then we have the person who has become addicted to the use of opiates, and, in every period of withdrawal, there is a phase of actual or feigned hypersensitivity, when pain seems to be excruciating. These are some of the things which the physician must keep in mind when he is attempting to make an actual appraisal of the significance of pain.

MECHANISM OF ABDOMINAL PAIN — ANATOMIC FEATURES

With this rather lengthy introduction, the possible mechanism for abdominal visceral pain may now be considered. Let us briefly consider the anatomic aspect of our problem. It should be self-evident that in order to feel or perceive a pain there must be a stimulus. The latter varies considerably depending on the part of the body that is being stimulated. Next, there must be a receptor apparatus in order to register the stimulus. These are naked nerve terminals specific for pain sensation. An intact conduction system of nerves is needed to carry impulses to the cortex and relay other impulses of notification to a

point near the site of stimulation. Impulses from skin, integument, and parietal peritoneum are carried over cerebrospinal nerve pathways to the posterior root ganglia. Then these nerves penetrate the posterior horn, cross to the opposite side of the cord, ascend for the most part via the lateral spinal thalamic tract terminating in the lateral nucleus of the thalamus, and thence are transmitted by another neuron on to the cortex.

Impulses from the viscera travel over afferent visceral fibers accompanying the sympathetics to posterior root ganglia via white rami communicans. These afferent visceral fibers enter the posterior horn along with the somatic neurons described previously. From here impulses over this so-called sympathetic system are carried over pathways identical to those of the somatic nerves described before.

The nerve fibers responsible for the conduction of nerve impulses from the site of the stimulus to the spinal cord vary greatly in diameter and in the speed of conduction of impulses. The largest myelinated fibers up to $20\ \mu$ conduct at speeds up to 100 meters per second. Very small unmyelinated fibers of less than $2\ \mu$ conduct at speeds approximating only 2 meters a second. There are many grades between these two extremes. Many of the afferent visceral fibers are small and conduct impulses at a slower rate than many of the larger cerebrospinal fibers carrying impulses from the integument. One is reminded at this point of the so-called "quick" and "slow" pain which arises after a sharp blow. The sensations experienced when the shin bone suddenly contacts an iron post or guard rail may be vividly remembered. Instantly a sharp, bright, well-localized epicritic pain is felt at the site of stimulus. These impulses were carried over large somatic fibers which have been well conditioned because of numerous antecedent skin stimuli. After a few seconds, another type of pain appears as a result of the blow on the shin. It is an ache or burn, which seems deep and more diffuse—the so-called "slow" pain—better described as protopathic rather than epicritic. This experience of sensations after a sharp blow to the shin well illustrates the significance of the site at which the stimulus is applied and the feeling which results, depending on the type and number of fibers entering into the circuit. The fast epicritic sensation is typical of a strong skin stimulus. If this type of pain occurs as a result of a visceral stimulus, the stimulus is usually strong and the threshold lowered by inflammation, causing a referred integumental pain. The secondary slow protopathic pain is quite like the pain so often produced by a visceral stim-

ulus. The impulses are carried over smaller nerve fibers at a much slower rate. Remembering this concept of quick and slow pain tends to fix in mind the concept of *sharp* referred pain and *dull* visceral pain.

ACTUAL MECHANISMS OF ABDOMINAL PAIN

At the turn of the last century, most students of pain mechanisms were convinced that the viscera themselves were inscnsitive to pain and that the visceral nerves contained no pain fibers. In 1760, von Haller proved by experiments that the visceral pericardium, visceral pleura, and visceral peritoneum are insensitive to mechanical stimuli. Lenander, in 1901, working with local anesthesia, noted the total insensibility of the bowel to the ordinary stimuli of cutting, pinching, and so forth. However, he found that if he pulled on the mesenteric attachment of the bowel, pain was experienced. He considered this proved that the viscera themselves were not endowed with pain fibers and that pain could not be experienced unless somatic nerve endings in the mesentery were stimulated. Further support for the concept of visceral insensibility has been supplied more recently. The mucosa of the gastrostomy of the patient was proved insensitive to touch, light pressure, temperature changes, and faradic current.

Is it true then that abdominal pain can be appreciated only if the stimulus is applied to a cerebrospinal nerve ending? No, this older concept is fallacious. The viscera have the same type of nerve fibers that are found in the skin. However, they are fewer in number, smaller in caliber, and they have not been accustomed to the type of stimuli which are commonly applied to the skin. In other words, they have not been conditioned as have the pain fibers of the skin. Indeed, in infancy the skin isn't so well conditioned either. Only after repeated stimuli have been applied is the young patient able to localize accurately the discomfort and define clearly its quality. Certainly normal viscera may be said not to appreciate slight stimuli of the type which when applied to the skin are perceived as painful sensations. For example, the gastric or colonic mucosa may be touched, pinched, or subjected to a faradic current and no sensation is perceived if the viscera are not inflamed. But there is an adequate stimulant capable of initiating true visceral pain which produces impulses that are carried entirely over the afferent visceral pathways. The adequate stimulus is increased intravisceral pressure caused by stretching, distention, or contraction of the viscus. This is the normal adequate stimulus for the initia-

tion of true visceral pain. The rate of distention is probably of greater importance in the initiation of pain stimuli than is the degree of distention or pressure. Changes in vascularization causing anoxia constitute additional stimuli capable of causing true visceral pain. Let us revert again to sensations experienced as a result of irritation of the gastrointestinal mucosa. It has been inferred that a strong stimulus must be applied to the mucosa, as compared with the skin, before sensation is produced. For example, in Wolf's experiments on the human subject with a gastrostomy, he demonstrated that if enough pressure (30 gm. per square centimeter) is exerted with a glass rod against the normal mucosa, discomfort results. Less pressure is required to produce pain if the stomach is contracting at the time pressure is applied.

As might be anticipated, a stimulus applied to a contracting viscus registers pain more promptly than a stimulus applied to a dilated viscus. Wolf also obtained additional confirmation for the occurrence of a lowered pain threshold in experiments on his human subject. He found that when the stomach is inflamed and congested, stimuli which ordinarily are not perceived when the mucosa is normal are now capable of causing pain. This is true, for example, after pinching or by the application of the faradic current. Now ample proof indicates that the pain threshold is lowered by inflammation; that mucosal irritation, which does not ordinarily cause pain, is responsible for pain if inflammation exists; and that sensations caused by distention and contraction of a viscus are intensified if the viscus is inflamed.

It was previously stated that true visceral pain is carried over afferent visceral fibers accompanying the sympathetic fibers. There are exceptions: for example, sympathectomy does not relieve pain due to stimuli arising in the low esophagus, trachea, and bronchi. High vagotomy does prevent pain from stimuli applied at these sites. Pain fibers do seem to accompany the vagi in these areas. There is no proof that pain fibers are associated with the abdominal vagi. Also, the fact should be borne in mind that the sacral parasympathetics carry pain fibers to the cervix, rectum, prostate, and bladder. A hypogastric sympathectomy cannot be expected to relieve pain originating from these viscera as it does from the uterine fundus.

POSSIBLE MECHANISMS OF ABDOMINAL PAIN

At least three possible mechanisms may be considered responsible for pain occurring as a result of visceral stimulation.

1. *True visceral pain.* This mechanism comprises pain sensations caused by an adequate stimulus such as distention or contraction of a hollow viscus. This type of pain occurs with exaggerated physiologic motor hyperactivity and may be purely functional. The entire reflex involved in the transmission of impulses may be via the afferent visceral fibers accompanying the sympathetic pathways. The cerebrospinal nerves need not participate. True visceral pain is apt to be protopathic, more in the nature of an ache or a burn. However, this pain may be severe, indeed excruciating, such as the deep pain of myocardial infarction. Although segmental, often true visceral pain is not well localized, but is diffuse, deep, and frequently vaguely situated in the midline. If the stimulus is great, localization may be more striking. However, in these instances, probably other mechanisms of transmission of impulses are present. True visceral pain without somatic nerve participation probably is not associated with skin hyperalgesia, Head's zones, or muscle guarding. This pain should be abolished by sympathetic denervation alone, if inflammation has not extended beyond the capsule of the organ to involve somatic nerve endings. Obviously, true visceral pain should also be relieved by rhizotomy or chordotomy (opposite side of the spinothalamic tract). If the visceral pain is supposed to be caused only by impulses carried over the afferent visceral fibers without somatic nerve participation, then sympathetic trunk denervation alone should be sufficient.

2. *Referred pain.* A second mechanism called into play as a result of stimulation of visceral pain fibers entails participation of both sympathetic and cerebrospinal nerve pathways. This is the mechanism of so-called referred pain. By communication of afferent impulses initiated in the viscus via sympathetic fibers with somatic dermatomes, the pain sensation is referred to areas supplied by somatic nerves of the same segment in the cord. MacKenzie and Ross explained this type of referred pain on the basis of the creation of an "irritable focus" in the cord brought about by bombardment of a cord area with pain impulses carried by the sympathetic fibers. It was presumed that normal impulses coming to the irritable focus would be translated into pain referred to skin areas which are in communication with the irritable focus. This theory is not generally accepted. The viewpoint of Hinsey and Phillips explaining referred pain has more support. They assume that both visceral and somatic afferent fibers carry impulses affecting a common pool of secondary neurons

and that the principle of summation and inhibition is applicable. Certainly afferent visceral fibers accompanying the sympathetics do intermingle with somatic afferent fibers from the skin. Both types of fibers may join the same second neuron in the cord. Ruch hypothesizes that there are many more pain fibers, both cutaneous and visceral, in the posterior roots than there are axons in the spinothalamic tract and that often both cutaneous and visceral neurons may converge on the same second neuron in the posterior spinal horn. Thus, when impulses from viscera reach the cerebral cortex, pain is interpreted as arising from the cutaneous pain neurons since the latter are more numerous than the visceral pain fibers and much better conditioned.

Referred pain is usually sharp and epicritic and well localized. Its site is apt to be lateral rather than midline. Head's zones of skin hyperalgesia and muscle guarding in the segment of the stimulus may be present. Ordinarily, referred pain is aroused by a strong stimulus or may occur in association with a low pain threshold. Actually, referred pain is usually the result of inflammation, not simply a functional derangement.

Many years ago Weiss and Davis were able to relieve to some extent the pain of visceral origin by a subcutaneous injection of 2 per cent Novocain at the pain site. This was thought to prove that the visceral pain in these instances was of the so-called referred type. Of interest is the fact that quite often relief was not complete and a deep dull pain remained. Evidently the less severe true visceral pain could be appreciated after the sharper referred skin pain was relieved. The usefulness of subcutaneous injections to alleviate referred visceral pain is not sufficiently appreciated today.

3. *Pain due to peritoneocutaneous reflex of Morley.* A third mechanism accounts for pain as a result of stimuli originating within the abdomen; the sympathetic fibers do not participate. Cerebrospinal nerve endings are present in the parietal peritoneum or just below it. Some of these fibers extend into the roots of the mesentery and the posterior parietes. Morley, an English surgeon, described this mechanism which is called the peritoneocutaneous reflex. He discovered that stimulation of the dome of the diaphragm on the under surface caused pain to be referred to the region of the trapezius muscle, the side of neck, and the radial side of the arm. The pain stimulus originated in the nerve endings of the phrenic nerve, a cerebrospinal component, and the radiation occurred over cervical

neurons with which the phrenic nerve communicates. Similarly, if other cerebrospinal nerve endings in the peritoneum or subperitoneal tissues are irritated, the communicating segmental somatic fibers may refer pain to a corresponding skin area. This is a type of abdominal pain in which only somatic or cerebrospinal nerves are involved. This type of pain originates most often as a result of inflammation of the parietal peritoneum or of the mesentery. The pain site corresponds closely to the segmental area which is being stimulated. Frequently pain of this nature is associated with spasm or guarding or rigidity of the abdominal wall musculature.

EXAMPLES OF PAIN MECHANISMS IN ABDOMINAL DISEASE

Apparently, then, at least three mechanisms may be called into play when pain stimuli originate within the abdomen. Perhaps an attempt to correlate theory with disease states may be of interest. The sequence of events might be explained from the standpoint of pain mechanisms in cases of acute appendicitis. In acute obstructive appendicitis before the stage of inflammation, the viscus becomes distended. The distention alone could account for the first protopathic type of pain which centers in the midline, in the periumbilical, or low epigastric area. Nausea and vomiting may occur at this stage, that is, the stage of true visceral pain in which impulses are carried over the sympathetic fibers only. After a time, inflammation ensues and sets up a bombardment of impulses over the sympathetic fibers. These impulses are now more numerous and are being carried more rapidly over the afferent sympathetic pathways. This should excite the secondary neurons in the cord and give rise to referred pain, so that during this second stage of the disease, referred pain may be experienced in the lower right abdominal quadrant. Skin hyperalgesia and the so-called "Head's zones of tenderness" may or may not be present. The disease progresses. Finally, the cerebrospinal nerve endings become irritated as a result of the associated peritonitis and the peritoneocutaneous reflex of Morley comes into action. This most intense pain is at first sharply localized to the site of peritoneal irritation. At this stage muscle guarding or rigidity is noted. This severe pain is localized at the site of the appendix. If the appendix is under the liver, the pain is in the upper right, not in the lower right abdominal quadrant. If the appendix is behind the cecum, the first two pains, which often are not too severe, may be difficult to appraise. Only with the advent of rupture and

peritonitis does the significance of the pain in the right loin become clear.

The sequence of events in the average attack of acute obstructive cholecystitis may be similarly explained. A calculus enters and remains in the cystic duct; the gallbladder becomes distended. If the event occurs during the day, the initial discomfort is not at the right rib margin but rather in the midline of the epigastrium. The pain is not sharp or bright but often a dull ache. At this stage, probably stimuli are only being carried over the afferent visceral fibers via the sympathetics. The stimulus is distention of the viscus. The cerebrospinal nerves do not participate and, hence, no lateral radiation of pain occurs. If the attack begins at night, the patient may never experience this early midline true visceral pain, since it is not of sufficient severity to awaken him. A patient often forgets, unless questioned, the initial midline visceral pain after the onset of the second pain of greater severity. Gradually the gallbladder becomes more distended, blood supply is disturbed, and actual inflammation of the gallbladder ensues. With inflammation comes lowering of pain threshold and a greater number of pain impulses. With greater distention, still more stimuli bombard the visceral nerve filaments. At this time, the intensity and number of impulses arriving over visceral fibers set up the commotion in the posterior horn that brings about participation of the somatic neurons, and the referred pain mechanisms are set in motion. Now pain is felt at or below the right rib margin and/or the right scapular region. Head's zones and muscle guarding may be elicited. If the inflammation continues and the distention becomes even greater, the anterior parietal peritoneum may be contacted and may become inflamed. Now the Morley

peritoneocutaneous reflex is initiated; pain impulses from the parietal peritoneum carried over somatic nerve endings cause excruciating pain of greatest intensity at the site the peritoneum is being irritated. If the gallbladder has descended greatly as a result of the distention, this last most severe pain of the gallbladder attack may be in the lower right quadrant and the first and second pains — visceral and referred — may no longer be appreciated. With the Morley reflex, the telltale rigidity of the abdominal muscles overlying the inflamed peritoneum occurs. If our thesis is sound, the sequence in disease of the hollow viscera often is: (1) first *distention* = dull midline true visceral pain, (2) *inflammation* of viscus = referred lateral pain with or without Head's zones and muscle guarding, and, finally, (3) contact of inflamed viscus with *parietal peritoneum* = peritoneocutaneous reflex of Morley with excruciating pain and muscle rigidity.

CONCLUSION

The need for the diagnostician to adopt some sort of tentative classification of pain mechanisms has been stressed. I have outlined the plan that I have used, fully realizing that many facets are not perfectly understood. I have also attempted to stress the broad concept of the pain experience or syndrome, pointing out the significance of pain threshold and of both physiologic and psychologic patient reactivity in any attempt to appraise the significance of pain. We have not had time to touch upon the differential diagnosis of abdominal and purely parietal pain due to neurologic and integumental abnormalities. It is hoped that sufficient emphasis has been placed on the deleterious effects of many pains on the organism and the importance of bringing about prompt and lasting relief.

TUBERCULOUS CYSTITIS responds well to an 0.2 per cent solution of Clorpac-tin 90, a chlorine derivative which releases hypochlorous acid. John K. Lattimer, M.D., and Anthony L. Spirito, M.D., of Columbia University and the Veterans Administration Hospital, New York City, instill 60 cc. of the medicament into the bladder every three days for three weeks through a 16 or 18F catheter. The bladder is then emptied after one minute, and the procedure is repeated four times. The germicide is also effective for cystitis due to *Bacillus proteus* and *Pseudomonas aeruginosa*.

JOHN K. LATTIMER and ANTHONY L. SPIRITO: J. Urol. 73:1015-1018, 1955.

The Glaucoma Problem

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NO SUBJECT in ophthalmology has led to more voluminous literature than has glaucoma, yet there is no immediate promise of a satisfactory solution to this devastating and frustrating problem.

Glaucoma is said to comprise a complexity of diseases which have as a common feature abnormal elevation of the intraocular pressure which results in damage to tissues and impairment of visual function.

The blindness of approximately 20,000 persons or 15 per cent of all blindness in the United States is due to glaucoma. An additional 150,000 individuals are blind in one eye because of glaucoma. It is estimated that approximately 1,000,000 Americans over the age of 40 years have undiagnosed glaucoma.¹ This figure represents roughly 2 per cent of the population over 40 years of age. With an increase of longevity this percentage, too, will increase.

Vaughan² and his associates working at Agnew's State Hospital in California selected 1,000 cases over 40 years of age. His group consisted of 5 ophthalmologists, 2 nurses, and 2 secretaries. A careful examination was performed which included internal and external examination of the eyes, determination of the tension, and study of the visual fields in selected cases. They found 19 cases of glaucoma. Over half of their patients were in the group between 60 and 70 years of age. All of them had pathologic cupping of the disks, and 3 had gross shallowness of the anterior chambers.

Christensen and Zeller³ carried out a similar study at the University of Oregon on patients admitted to the hospital. Approximately the same percentage of undiagnosed glaucoma was found among patients over 40 years of age. Their studies were carried out by interns who had been given a short course of instruction regarding the use of the tonometer. Although the Schiøtz tonometer is delicate and difficult to handle at first, the interns acquired skill quickly and were able

to produce acceptable readings after a short period of practice. Although the interns discovered these cases of glaucoma which could have resulted in blindness, not one ever determined another intraocular tension with a tonometer after he left the ophthalmology service. This fact indicates that our physicians are not adequately indoctrinated in their formative years, namely, during medical school.

It is well recognized that glaucoma produces blindness which is frequently a catastrophe to the patient as well as a large economic loss to the community. When treated adequately, 85 per cent of cases diagnosed in the early stage¹ retained useful vision and escaped blindness. For that reason, every effort must be made to educate the public and improve the diagnostic acumen of the medical profession so that glaucoma can be recognized early before serious pathologic changes have intervened. Case finding is most important and is difficult because in early chronic glaucoma, pain or visual disability seldom occurs, especially if the optic nerve has not been damaged. Routine eye examinations must be employed to detect these cases. Patients with more advanced glaucoma may complain of frequent changes of glasses, none of which are satisfactory; inability to adjust the eyes to darkened rooms; loss of side vision; blurred or foggy vision; or rainbow-colored rings around the lights. Therefore, the best defense against glaucoma is a thorough eye examination at least every two years after the patient reaches 40 years of age.⁴

The public manifests an unusual degree of ignorance regarding glaucoma in spite of its prominent position among the causes of blindness. Vaughan² interviewed 100 patients in private practice who were over 40 years of age. Of these, 69 know nothing about glaucoma, 11 had heard of the disease, and 20 were fairly well informed.

It is unfortunate that our public has such faith in glasses and yet fails to realize that ocular symptoms may result in disease as well as a need

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Presented at the seventy-seventh annual meeting of the Montana Medical Association, Bozeman, Montana, September 15-18, 1955.

for glasses. Furthermore, it is regrettable that such a large segment of our population is satisfied with a hasty, supposedly free examination sufficient to permit the sale of a pair of glasses without an attempt to discover ocular disease. In this same category are many individuals who purchase their glasses from a variety store or inherit them from well-meaning friends or relatives. The amount of advertising in newspapers, over the radio, and in television is enormous and is largely designed to promulgate the sale of glasses. Seldom, if ever, is mention made of the possibility of the existence of ocular disease. It is disheartening, indeed, to see an elderly patient enter the office carrying several pairs of glasses and begin the conversation immediately by saying, "Doctor, I wish you would give me a pair of glasses so that I can see," and not, "Doctor, please examine my eyes and find out what is wrong." To these unfortunate people, the only problem seems to be that of selecting the proper spectacles and not the discovery of a disease process. Superficial examination of one of these patients may reveal elevated intraocular tension, a pale and deeply cupped optic disk, and loss of a great deal of peripheral vision. In such cases, the patient is on the road to blindness because of chronic glaucoma. I assure you this is not a rare experience to the ophthalmologist.

The public must be educated regarding the existence of glaucoma and the importance of a proper eye examination. The medical profession must become glaucoma conscious. Physicians in general practice should palpate the eye to determine whether the tension is grossly elevated and examine the interior of the eye to determine whether the optic disk is abnormally cupped and pale. In due time, use of the tonometer for the purpose of determining intraocular tension will become more and more a part of a routine physical examination.

The medical profession accepts routine urinalysis, Kahn test, blood pressure determinations, and, in some vicinities, roentgenograms of the chest as normal procedures in the practice of medicine. Vaughan² reports that in routine chest roentgenograms of individuals in Santa Clara County, only 0.15 per cent were found positive. This low percentage falls quite short of the 2 per cent of individuals over 40 who have undiagnosed glaucoma.

ANATOMY

The normal eye is approximately 25 by 24 mm. in size. The outer coat consists of sclera and cornea. The medial coat or uvea consists of the iris, ciliary body, and choroid. The inner coat

consists of the retina and optic disk. There are 3 chambers: namely, the anterior, posterior, and vitreous. Vitreous fills four-fifths of the eye. The anterior chamber is bounded anteriorly by the cornea, laterally by the filtration angle, and posteriorly by the iris and lens. Behind the iris is the posterior chamber. Aqueous is formed in the posterior chamber and passes forward through the pupil into the anterior chamber and escapes through the filtration mechanism found in the angle. Aqueous passes through the trabecula, a sieve-like structure, into the canal of Schlemm and through the external collector channels into the intrascleral venous plexus to be carried away into the venous circulation. This is often referred to as the escape facility.

Glaucoma has been classified as primary and secondary. The primary glaucomas are those for which we cannot offer as yet any specific cause. The secondary glaucomas are those which have a known cause. The primary glaucoma has been further classified into two types: namely, chronic simple glaucoma (open angle glaucoma) and acute iris block glaucoma (acute narrow chamber angle or acute congestive glaucoma).

CHRONIC SIMPLE GLAUCOMA

Chronic simple glaucoma far overshadows all other types. This is the common variety which causes such pronounced devastation to the eye with minimum symptoms. This form often must be discovered by the examiner without assistance from the patient. The onset and development are so insidious that the patient experiences no symptoms or, if present, these are so mild that they are accepted as being of no importance.

Chronic simple glaucoma is believed to be the result of a degenerative process localized primarily in the collagen tissue which lies in the region of the escape channels in the filtration angle (figure 1). Teng⁵ made detailed histologic studies of 3,000 eyes received at the New York Eye Bank. He found that a specific degeneration

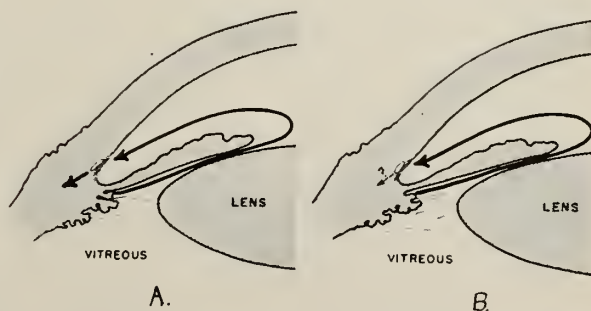


Fig. 1A. Open angle in chronic simple glaucoma. (B) Obstruction of escape facility may be due to degeneration of collagen tissue in this region.

of the collagen tissue involving the trabecula, canal of Schlemm, and collector channels existed in 12 per cent of individuals over the age of 50 and was entirely absent in the eyes of those under 20. He also found that the same type of degeneration was present in a more pronounced degree in 3 known cases of chronic simple glaucoma.

The optic nerve is an intermediary tract of the brain and, therefore, has no ability to regenerate after complete injury of the fibers or the ganglion cells. Each nerve fiber is myelinated until it reaches the lamina cribrosa which resembles a sieve in the region of the posterior foramen of the globe. Fibers immediately lose their myelination as they pass through the lamina cribrosa into the eye. The lamina cribrosa is one of the weakest points of the eyeball. When the intraocular pressure is elevated abnormally, the lamina cribrosa is depressed producing cupping of the optic disk which, in turn, causes destruction of the optic nerve fibers. This destruction of nerve fiber bundles in the optic nerve produces a loss in the periphery of the visual field with contraction and formation of blind areas. Unfortunately, the central vision may be spared for a long period so that a patient may still be able to read newsprint but be helplessly disabled because of contraction of his visual fields to "gun-barrel" proportions. If not controlled, chronic simple glaucoma progresses inexorably to blindness which may ultimately result in a painful eye requiring enucleation.

ACUTE IRIS BLOCK GLAUCOMA

The acute iris block glaucoma is associated with severe and unmistakable symptoms. Unlike chronic simple glaucoma, this type tends to be intermittent, acute in nature, and at times unbearably severe. Individuals who suffer with this disease have an abnormally shallow anterior chamber which is often a familial characteristic. Because of the extreme shallowness of the angle, dilatation of the pupil, with or without congestion of the ciliary body, may result in sudden blockage of the trabecula and prevent escape of aqueous from the anterior chamber. Emotional disturbances, acute illness, dilatation of the pupil during attendance at a movie, or swelling of the lens as in an intumescent cataract may be contributory factors in the sudden onset of acute iris block glaucoma.⁶ Sudden blockage of the escape facilities by the iris leads to an attack of acute, severe, often unbearable pain, pronounced congestion of the globe, steaminess of the cornea, dilatation and even paralysis of the pupil, and rapid deterioration of the vision (figure 2).

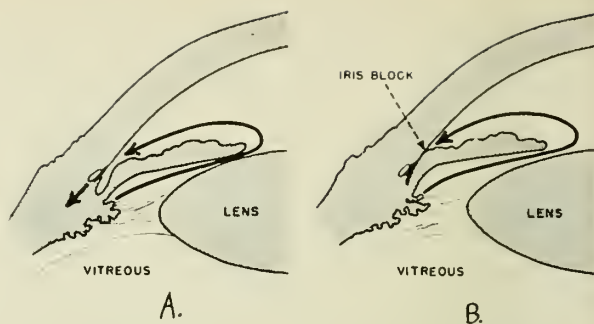


Fig. 2A. Shallow chamber angle. (B) "Iris block" mechanism producing sudden obstruction of aqueous escape by contact of iris on the trabecula is demonstrated.

This condition is occasionally mistaken for a disease involving the abdominal viscera because the patient is often vomiting and in such a severe state that no mention is made of the eye to the physician.

Unfortunately, acute glaucoma and acute iridocyclitis are sometimes erroneously diagnosed and treated as acute conjunctivitis (pink-eye). The doctor should bear in mind that as a general rule acute conjunctivitis involves both eyes, produces a sensation of "sand in the eyes," does not produce pain, and does not result in a noticeable loss of vision. When the physician is consulted by a patient who has only one red eye, complains of pain, and has noticed a diminution in vision, he should avoid the pitfall of treating the case as if it were acute conjunctivitis. The physician must be alert to avoid this unfortunate mistake because the loss of several days may prove to be disastrous to the patient.

CONGENITAL GLAUCOMA

Congenital glaucoma is still badly neglected and one of the principal causes for admission to the Blind School. In about 40 per cent of the cases, the condition is present at birth.⁶ When the infant is born with glaucoma, his eyes are palpably hard and the corneas are steamy and even opaque. The symptoms may appear shortly after birth. Evidence of photophobia and tearing, congestion, and steaminess of the cornea may be early indications of congenital glaucoma. A child under 3 years of age has a relatively elastic cornea and sclera so that increased intraocular pressure results in enlargement of the eye. The physician should be extremely suspicious of the child with a large eye with or without symptoms. When and if the physician suspects the presence of congenital glaucoma, he should obtain immediate assistance from an ophthalmologist who, in turn, must examine the patient carefully under a deep general anesthesia. The ophthalmologist determines the condition and the measurements

of the corneas, the depth of the anterior chambers, the intraocular tension, and the condition of the optic nerves. If congenital glaucoma is detected early and proper surgery is carried out, which usually consists of a skillfully performed goniotomy, a high percentage of these patients escape blindness.

SECONDARY GLAUCOMA

Standard textbooks list a multitude of causes of secondary glaucoma. These causes fall within the following 6 main categories: (1) trauma, (2) inflammation, (3) degeneration, (4) vascular, (5) endocrine, and (6) tumors.

Trauma is a prominent cause of secondary glaucoma. Hemorrhage into the anterior chamber, lacerations of the globe, injuries to the lens resulting in cataract or dislocation, or persistent iridocyclitis are among those encountered.

Acute inflammation is usually not associated with glaucoma. Chronic inflammation either produces adhesions between the iris and the lens at the pupil, thereby sealing off the posterior chamber and the escape of the aqueous, or produces adhesions between the iris and the trabecula (anterior peripheral synechias) and thereby prevents the escape through the normal angle facility. Prompt and adequate treatment of ocular inflammations does much to reduce the incidence of secondary glaucoma.

Degeneration of structures within the globe, such as formation of intumescent cataract, late degeneration of a cataract, or pseudoexfoliation of the lens capsule, may lead to glaucoma.

Occlusion of the central retinal vein, pronounced hemorrhages due to hypertension, or blood dyscrasias may result in secondary glaucoma.

Diabetes mellitus which results in the formation of a membrane on the anterior surface of the iris and into the angle obstructing the escape facility results in an intractable secondary glaucoma.

Tumors of the iris which extend into the angle may produce secondary glaucoma. Malignant melanomas arising from the choroid invariably produce secondary glaucoma if they are permitted to remain long enough. For that reason, a blind glaucomatous eye should be enucleated.

The ophthalmic pathology laboratories have numerous specimens which demonstrate malignant melanomas which were discovered only by histologic examination.

TONOMETRY

During the past few years an effort has been made to simplify the determination of the intraocular tension. The Berens-Tolman tonometer has been developed and made available to many general practitioners for this purpose. The principle of the tonometer is reasonably simple. In order to determine the pressure within a bicycle tire, an examiner merely places his thumb upon the tire and makes an indentation. If the thumb is able to indent the tire easily for a considerable distance, the examiner feels that the pressure is low and if the thumb scarcely indents the tire, he knows that the pressure is high. The plunger on the tonometer does precisely the same to the cornea. The Berens-Tolman tonometer does not determine the true value of the intraocular tension but merely shows whether or not the tension is low, normal, or above normal. Acting as a screening device,¹ much promise is held for an instrument of this type for use in a routine physical examination. All cases which demonstrate elevation of the intraocular tension and/or cupping of the optic disk must be studied thoroughly by an ophthalmologist.

SUMMARY

Glaucoma is a principal cause of blindness in the United States. Approximately 2 per cent of all individuals over the age of 40 manifest undiagnosed glaucoma. As a general rule the symptoms are mild or absent, requiring discovery by objective studies. Proper education of the public regarding the existence of this disease and the importance of adequate ocular examinations is essential. The determination of the intraocular pressure by the general physician must become more and more a part of a routine physical examination. Parenthetically, routine tension studies by the ophthalmologist must likewise become a reality. Efforts by the medical profession are not without reward because approximately 85 per cent of glaucoma cases which are diagnosed early and treated adequately retain useful vision.

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Para-Aminobenzoic Acid and Salicylates in the Treatment of Arthritis

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WITHIN RECENT YEARS considerable evidence has been presented to explain the mechanism of action of salicylates and para-aminobenzoates in the treatment of rheumatic infections, particularly rheumatoid arthritis. The action of both these drugs seems definitely associated with the adrenocortical hormone. Because of the facilities provided by the Long Island College Hospital in Boston and in the Cambridge City Hospital, a clinical study conducted with these compounds seemed especially desirable since the patients could be kept under continuous observation. Therefore, the object of the present study was threefold, as briefly outlined:

1. Establishment of a statistical basis in support of previous observations that the concurrent administration of para-aminobenzoate and salicylates results in a higher therapeutic index than is generally observed after the use of salicylates alone in equivalent doses.

2. Comparison of the clinical results obtained in arthritis, as judged by clinical impression on the remission of signs and symptoms produced by the concurrent use of para-aminobenzoate and salicylate as compared with salicylate (aspirin) alone.

3. Determination of the effect of para-aminobenzoate-salicylate combination (Pabalate) upon the response of the patient to cortisone therapy, and especially to observe whether such adjunctive therapy can reduce the cortisone requirement and maintain a satisfactory clinical response.

Because the role of salicylates and steroid hormones in arthritis therapy has been recently reviewed in some excellent articles on this subject,

no attempt will be made here to discuss the subject in great detail. The advent of cortisone, however, suggested to many investigators that the salicylates might be effective in the treatment of arthritis, either through direct stimulation of the adrenal glands or indirectly by way of the pituitary and the adrenocorticotrophic hormone. From the data which has accumulated thus far, it appears highly probable that salicylates obtain their particular effect through the pituitary-adrenal mechanism, and this observation seems to have been adequately confirmed.

Cauwenberge and associates^{1,2} suggested this mechanism of action when they found that salicylates increased the urinary 17-ketosteroids. In the same year, Champy and Demay³ experimented with rats and found that adrenal ascorbic acid diminished by one-third after a single dose of salicylates. They assumed that the salicylates act indirectly on the adrenals through the pituitary by inducing the production of ACTH. It has also been observed that the characteristics of a mild Cushing's syndrome may develop in some patients during intensive salicylate therapy.⁴ Almost simultaneously with these observations, Wiesel and associates,⁵ using para-aminobenzoic acid salt concurrently with cortisone in the treatment of rheumatoid arthritis, reported that they were able to obtain a satisfactory remission of signs and symptoms of this disease with a significantly smaller cortisone dosage. Further studies by Wiesel and his co-workers confirmed this impression, and quite recently these investigators obtained objective evidence that para-aminobenzoates compete in the liver with the inactivation of the adrenocorticosteroids^{6,7} which, for the purpose of practical consideration, would have the effect of inducing a small, though significant, cumulative effect of administered cortisone.

Other investigators, using concurrently para-aminobenzoates and salicylates, have reported that excellent clinical results were obtained with fewer undesirable side reactions. With this combination of drugs, a higher salicylate level was

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obtained than had been achieved with an equivalent dosage of salicylate alone.^{8,9} The explanation has been advanced that the higher blood salicylate level resulted from a mutual decrease in urinary clearance. These observations have also been subsequently confirmed by a number of investigators but have not been generally accepted because the therapeutic response to salicylates in the treatment of rheumatic fever is difficult to correlate with the blood salicylate level. It is more plausible, therefore, to consider the observation that both salicylates and para-aminobenzoates not only compete in the liver for their own inactivation and conjugation, but together might reduce the rapidity with which endogenous and exogenous cortisone could be inactivated.

Hailman¹⁰ noted that both salicylates and cortisone caused a drop in adrenal ascorbic acid, a decrease in the eosinophils, an increase in the urinary 17-ketosteroids, and a decrease in the sedimentation rate and in the signs and symptoms of rheumatoid arthritis. However, because salicylates exert a direct analgesic action which is not enjoyed by the adrenal hormone, it is often difficult for the clinician to discriminate between analgesic masking of symptoms and a rapid remission brought about by therapeutic, corrective measures. It has long been known that in the treatment of rheumatic infections, the salicylates can exert a therapeutic action which even more potent analgesics seem unable to produce.

For convenience, a combination of sodium salicylate and sodium para-aminobenzoate (Pabalate) was clinically evaluated in a series of 60 arthritic patients at the Long Island Hospital, and the results compared with those obtained with aspirin, as well as with the use of placebos. These patients were normal, elderly, custodial residents and, therefore, under continuous observation. Another 60 patients served as controls and a means for determining comparative changes in the laboratory picture in arthritic patients and normal persons of comparable age.

During a period of two months, clinical and laboratory observations were made on all patients. The clinical observations included general well-being, appetite, physical activity, and such local symptoms as pain, swelling, and mobility of the joints. For comparison with any possible future side effects, we noted the condition of the skin and gastrointestinal and cardiorespiratory systems. Laboratory findings comprised sedimentation rate, eosinophil count, cholesterol, hemoglobin reports, and salicylate levels. The latter were important to make sure no patients took aspirin secretly, since the desired salicylate

level was zero in this part of the investigation.

The entire series of 120 patients was divided into 4 treatment groups after the initial control period of observation had been completed.

Group 1 received 8 aspirin tablets each day for eight weeks, followed by 8 Pabalate tablets daily for eight weeks.

Group 2 received a placebo, 8 tablets each day for eight weeks, followed by the same dosage of Pabalate for eight weeks.

Group 3 received a placebo, 8 tablets each day throughout the four-month period.

Group 4 received 8 aspirin tablets daily for two months and 8 Pabalate tablets daily for two months. The experiment was then continued with maximum improvement with cortisone, then cortisone with Pabalate, or Pabalate alone. This group's schedule is discussed later.

The 60 patients who received the drug combination for control purposes was a sufficient number to furnish an adequate statistical basis for observing the incidence of possible undesirable side reactions. No evidence of tinnitus or salicylism was noted, although a skin rash resembling measles developed in 2 patients, and a mild laxative effect was observed in 2 others. However, no serious or severe complications were encountered with the Pabalate group. Of the patients receiving cortisone, severe psychotic reactions developed in 2, serving to emphasize the need of exercising every precaution in its use.

The concurrent use of para-aminobenzoates and salicylates seemed to result in a therapeutic synergism without the high incidence of undesirable effects which have been observed after the use of large doses of salicylates alone. While the improvement in the group of arthritics as a whole was, although significant, not very extensive, the degree becomes more definite when a distinction is made between the severe ankylosed group and the early mild cases. Our series contained a large number of the former group. Laboratory findings indicated that the salicylate level varied considerably in all groups and was not an accurate index of therapeutic response. It did not seem possible to attach much statistical significance to the sedimentation rate studies because this rate was higher in the control group of patients than the value which has been reported for individuals of comparable age groups. A slightly higher elevation was noted, however, in the arthritic group, but the rate remained elevated throughout the entire study in both groups and, therefore, suggested the need of some revision of the standards for sedimentation rates in elderly individuals. A slight decrease in the sedimentation rate occurred while the patients

TABLE 1

	Before treatment		—Treatment period—				After treatment		Medication
	Eight weeks		Four weeks		Four weeks				in treatment
	A	N	A	N	A	N	A	N	period
Eosinophil count	189	255	213	217	212	185	129	185	Aspirin
	180	250	202	200	306	134	128	188	Pabalate
	157	135	184	177	171	157	163	131	Placebo
Sedimentation rate First hour	53	35	42	42	45	41	48	42	Aspirin
	53	35	29	37	36	52	45	45	Pabalate
	59	49	55	51	50	44	53	51	Placebo
Sedimentation rate Second hour	82	62	65	65	69	70	68	65	Aspirin
	82	60	55	57	63	73	66	69	Pabalate
	79	71	71	67	67	63	69	67	Placebo
Cholesterol	152	202	189	193	214	201	211	237	Aspirin
	158	204	191	183	214	210	214	254	Pabalate
	221	175	196	223	179	188	182	192	Placebo

were receiving salicylate therapy and tended to stay at a lower level through the subsequent control period. Eosinophil count showed a slight fall of doubtful significance and no changes were noted in the serum cholesterol values (table 1).

Columns in this table labeled A refer to arthritic patients; columns headed N refer to the non-arthritic patients used as controls. Columns under Treatment Period present the average values for eosinophil count, sedimentation rate for the first and second hours, and cholesterol level during the period of treatment.

In order to evaluate the influence of the para-aminobenzoate and salicylate combination on the cortisone requirements in arthritic patients, a schedule was outlined wherein the patient received 100 to 200 mg. daily for the first eight days, 75 mg. daily for the next eight days, and during the third week the amount was reduced to 25 mg. daily with the concurrent administration of 8 tablets of Pabalate. Subsequent studies were made to estimate the relative amounts of cortisone necessary to maintain remission of symptoms in the arthritic patient while receiving this combined therapy. In the far-advanced, severely crippled arthritic patient, the use of cortisone as the sole therapeutic agent has been attended by a high incidence of mental complications, and in an institution which is devoted principally to

the treatment of chronic diseases, the staff is reluctant to use cortisone if symptomatic relief of symptoms seems possible with other therapeutic agents. Even some patients feared cortisone, possibly because of impressions gained from articles in some popular magazines and journals.

SUMMARY

1. In the treatment of the milder forms of arthritis, especially of ambulatory patients, when pain prevented performance of their normal duties, the concurrent use of para-aminobenzoate and salicylate resulted in a more pronounced and sustained therapeutic response than did the use of salicylate alone in equivalent dosage.

2. A more significant decrease in the incidence of undesirable side reactions resulted from this combination of drugs than with the use of salicylate alone in equivalent dosage.

3. The results of this study seem to confirm the observations of previous investigators and indicate that the para-aminobenzoate and salicylate combination, when used as supplementary therapy to cortisone, permits effective control of the arthritic syndrome on a small cortisone dosage and with few undesirable complications.

Pabalate furnished through courtesy of William R. Bond, M.D., director of clinical research, A. H. Robins Co., Inc., Richmond, Virginia.

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Gastrointestinal Hemorrhage

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GASTROINTESTINAL HEMORRHAGE can be one of the most baffling diagnostic and therapeutic problems confronting the physician and surgeon. In 10 per cent of the cases, the source of bleeding is not even determined after autopsy.

Although there are 26 or more possible sources of hemorrhage, approximately 1 out of every 2 patients bleeds from a benign peptic ulcer. In about 20 per cent of the cases, esophageal varices are the source of hemorrhage. Many other important conditions must be considered, even though they constitute only about one-third of the possible causes. Gastrointestinal bleeding may result from: (1) peptic ulcer; (2) esophageal varix; (3) gastritis, acute and chronic; (4) gastrojejunal ulcer; (5) carcinoma of the gastrointestinal tract; (6) lymphoma, sarcoma, and Hodgkin's disease; (7) trauma and foreign body; (8) purpura haemorrhagica; (9) Meckel's diverticulum; (10) leiomyoma; (11) hiatus hernia; (12) ulcerative colitis; (13) use of dicumarol and other drugs; (14) polyps; (15) mesenteric thrombosis; (16) diverticulosis; (17) intestinal volvulus, intussusception, and hernia; (18) acute enteritis and dysentery; (19) tuberculosis; (20) fluke and other parasites; (21) hemorrhoids, fissure, and fistula; (22) proctosigmoiditis; (23) allergy; (24) pruritus ani; (25) regional enteritis; and (26) benign tumors.

In attempting to make a diagnosis during a serious emergency, certain signs and symptoms may prove helpful. The history may be significant, especially in the case of chronic ulcer. The color of the blood also may be important. If blood appears in a tarry stool, the classical picture of peptic ulcer must be considered. If it is maroon colored, the bleeding may be coming from lower down in the intestinal tract, as from a Meckel's diverticulum. If it is bright red and spotting, probably a hemorrhoid or a fissure is the cause but, if more profuse, cancer of the rectum may be responsible. Esophageal varices may be the source of hematemesis, but, if profuse, probably carcinoma of the stomach is

the cause, especially if the appearance is that of coffee grounds.

The following is a summary of some of the more important points in the diagnosis and treatment of these conditions:

Peptic ulcer may occur at any age but is most prevalent in thin, nervous, tense, middle-aged males who smoke. Approximately 25 per cent of these patients give no previous history of ulcer. The remainder give a chronic history of from one to twenty years of periodic attacks of epigastric pain occurring most frequently in the spring and fall of the year about one or two hours after eating. The pain is often eased by drinking milk and soda and is made worse by fried foods, condiments, pickles, and by not eating. The patient may give a history of one or more previous episodes of bleeding. In recent years, the trend has been increasing in favor of roentgen-ray examinations of these patients unless they are in shock.

Great difference concerning the best method of treatment in these cases exists among internists and surgeons alike. Finsterer of Vienna was among the first to favor early gastric resection of these acute hemorrhaging ulcer cases. Some American surgeons have subscribed to this radical form of treatment. In some reported series of cases, the mortality has been reported as high as 25 per cent, but, in recent years, with improved methods of anesthesia and preoperative treatment, better results are being noted. Other surgeons, to which group I belong, favor conservative treatment of these patients. Nor is there any unanimity of opinion regarding the proper method of conservative treatment. One school advocates frequent feedings of small amounts of food, as is favored by Meulengracht, and multiple blood transfusions; still others prefer the Andresen diet.

In my own experience, 122 cases of acute gastrointestinal hemorrhage have been treated conservatively with the loss of but 1 patient. This was an elderly male with a large malignant gastric ulcer, who bled to death the night of admission in spite of repeated blood transfusions.

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There can be no fixed rule for *bleeding ulcer* cases, but they must be treated according to the indications. If the patient is a young man and bleeding for the first time, the chances are good that nature alone may stop the bleeding unless, however, blood pressure falls steadily, signs of shock increase, and repeated hemorrhage occurs. I prefer not to use transfusions and to keep the patient's stomach empty for forty-eight hours. Fluids are given subcutaneously. Oxalic acid in the form of Koagamin is given in doses of 3 cc. intravenously, followed twice by 2 cc. doses at hourly intervals given subcutaneously. This preparation has been used for fifteen years in approximately 40 cases of all types of gastrointestinal bleeding.

In many instances, such as in bleeding from a leiomyoma in a patient in whom blood transfusions had previously been given without results; in a case of severe bleeding from a Meckel's diverticulum; and in an 86-year-old man with a bleeding ulcer, Koagamin produced dramatic results. The solution will not stop the hemorrhage of a large sclerotic vessel, but it has often proved effective and lifesaving when all other methods failed.

If no indication of cessation of bleeding is noted after twenty-four to forty-eight hours, blood transfusion is indicated in most instances. However, in these days of pooled plasma as well as blood, I no longer look upon blood transfusion with impunity, and, with our improved technic in gastrointestinal surgery in the past decade, I am surprised how seldom a blood transfusion is necessary.

After the bleeding is checked and the diagnosis established, the problem is what to do. If the source is a duodenal ulcer in a young or even middle-aged individual and bleeding has occurred for the first time, most physicians agree that conservative ulcer therapy is indicated. In my opinion, sufficient attention has not been placed on the importance of eliminating stimulants, such as caffeine and nicotine, in such patients. For twenty-five years my practice has been to refuse to treat patients who will not give up stimulants because I have seen too many unsatisfactory results, even from gastric surgery performed by eminent surgeons, if the patient continues to use stimulants.

The youngest patient I have operated on in this group was 17 years old and continued to have exacerbation of bleeding in spite of all medical measures. After gastric resection, he has been well for a year. If the patient is past 50 years and repeated hemorrhage has occurred, gastric resection is fairly generally believed to

be indicated. Yet I have a number of patients of this type who have remained well for years on conservative treatment and proper regime.

When the roentgen findings are negative, the problem is more complicated. Gilchrist has felt that bleeding may be from minute ulcerations not even grossly visible and that a near total gastric resection should be performed. Still, the possibility is ever present that the roentgenologist may have overlooked a leiomyoma of the small bowel or some other not easily detectable lesion.

If surgery is decided upon, I prefer to perform the operation, if possible, when the bleeding has been controlled and the patient is in good condition. I believe the removal of 60 to 70 per cent of the stomach is sufficient, and I routinely use the modified Hofmeister technic with the anterior loop and anastomose the proximal loop to the greater curvature. The late Dr. Frank Lahey had preference for this operation. I do not feel that the Billroth I operation has any particular advantages, although it is preferred by some eminent gastric surgeons. The important thing to me is to try to perfect the particular technic in a certain operation and employ that method whenever possible. For some years, I have made no attempt to excise ulcers penetrating the pancreas, which are so frequently seen in bleeding cases. As far as can be ascertained, this does not alter the end result of surgery.

Bleeding from sources other than ulcer may frequently result from esophageal varices, and, of the many suggested methods of treatment for this condition, no procedure has proved generally satisfactory. The various shunt operations are long, tedious, and often serious risk operations with frequent unsatisfactory results. Rienhoff and Berman have advocated ligation of the hepatic artery, and at first this procedure seemed to offer considerable promise. The eleventh reported case was a patient on whom I performed this operation, but, after a few months respite, bleeding recurred and the final outcome was fatal. Other methods have proved to be of only palliative benefit. The presence of cirrhosis and ascites and a history of alcoholism may suggest the possible cause of bleeding in these cases.

One of the most satisfactory results I have achieved was in a patient upon whom I performed gastric resection for Hodgkin's disease of the stomach. He has remained well for five years since. No surgeon is enthusiastic about his final results for cancer of the stomach. Though the hemorrhage is stopped, sooner or later the patient succumbs to this disease.

The most remarkable case in my series was

that of a 54-year-old man who suddenly collapsed and was thought to be suffering from a bleeding ulcer. Hemorrhage persisted in spite of every treatment except surgery. He received blood transfusions without avail. Finally, when his hemoglobin was down to 25 per cent and the red blood cell count was 1,500,000, bleeding was checked by administration of Koagamin. When roentgen studies proved negative, no surgery was attempted. Another episode of bleeding two years later was immediately controlled by Koagamin. After another bleeding spell seven years later, abdominal exploration revealed a jejunal leiomyoma, removal of which resulted in a cure.

In 1927, a case of intestinal bleeding from a *Meckel's diverticulum* was reported in the *Annals of Surgery*. The first case of this type successfully cured by surgery was reported by my brother, the late Reginald H. Jackson, Sr., in the same medical journal. In both of these cases, the bowel was resected and the patients were cured. Recently George P. Schwei and I reported 39 cases of *Meckel's diverticulum*, to which 10 more have been added, but in only 4 cases was bleeding a factor.

Hiatus hernia and gastrojejunal ulcer are occasional sources of bleeding. In both conditions, the type of complaint is fairly typical. Both are recognized by roentgenograms, and both require surgical treatment.

Ulcerative colitis may cause intestinal bleeding, the source of which may be suspected from the history and the diagnosis can be established by roentgenograms. In recent years, advances have been made in the treatment of this serious disease, and I have been gratified by the results of total colectomy in the patients operated upon.

Regional enteritis is a disease that has baffled the medical profession ever since Crohn and Kantor first presented the classical picture of this condition in 1932. Both its etiology and its cure remain an enigma. In the acute stage, it may simulate appendicitis, but, in the second stage, bleeding and dysentery may occur. Then comes the obstructive stage, and finally fistulae occur. The best method of treatment is surgical, either a sidetracking ileocolostomy or resection, but, in either case, recurrence is apt to follow. This subject first interested me nineteen years ago when I reported 5 cases from the Jackson Clinic and 64 cases from a survey of the Western Surgical Association. Since that time, well over 1,000 cases have been added to the literature. Splendid contributions have been made by Garlock and Dixon, who were the original investigators, as well as by numerous other authors.

During recent years, considerable interest has

been focused on intestinal polyps and their relationship to malignant lesions of the colon. *Polyps* and *diverticula*, which may occur in either the small or large bowel, are a definite source of bleeding and should always be suspected. All polyps should be removed surgically, and, if malignancy is suspected, resection should be performed. Diverticula can generally be treated by conservative measures, but, if they are a source of perforation or hemorrhage, surgery may be required.

Since the discovery of dicumarol by Link, this drug has been used generally as an anti-coagulant by surgeons in the treatment of phlebitis, embolism, and mesenteric thrombosis and by physicians in the treatment of coronary thrombosis. In spite of a careful check on the prothrombin time, this agent may occasionally give rise to bleeding from the intestinal tract. The possibility that anticoagulants can cause hemorrhage should always be remembered. Other drugs, such as aspirin, may likewise be responsible.

Trauma as a source of bleeding, such as from a knife or bullet wound, a severe blow, an auto accident, or the swallowing of sharp objects, is always a possibility. In such cases, roentgen studies may prove invaluable, but, with the progressive symptoms indicated, I believe a better procedure is to give blood transfusions and explore the abdomen, even if the findings are negative, rather than to court possible disaster by watchful waiting.

Purpura haemorrhagica may occasionally be a source of bleeding from the intestinal tract. I recall an interesting case of exophthalmic goiter, which was caused by the use of Lugol's solution. Elimination of the drug for a few days checked the bleeding and permitted thyroidectomy to be performed.

Acute gastritis and *enteritis* are not uncommon sources of bleeding, and both usually respond promptly to medical measures.

Certainly one of the most important causes, and one that unfortunately is too often overlooked and considered to be the result of hemorrhoids, is *cancer*. If the lesion is in the cecum or ascending colon, blood in the stool may not be observed by the patient, but bleeding is often suspected when a blood count shows a secondary anemia or the disease may be detected by an occult blood test of the stool. On the other hand, bleeding from the rectosigmoid region is usually bright red and evident immediately to the patient. The earlier surgical procedures are instigated in these conditions, the better the hope of cure.

Other possible sources of hemorrhage from the gastrointestinal tract are too numerous to discuss in this brief treatise, such as mesenteric thrombosis and intestinal obstructions. However, if the 26 causes of bleeding listed here are considered, there is about a 98 per cent chance that one of them is responsible. No one has all the answers to the many problems connected with this subject, and one of the most frequently debated subjects in medical meetings is the treatment of gastrointestinal hemorrhage.

SUMMARY

1. Gastrointestinal hemorrhage is one of the most baffling diagnostic and therapeutic problems

with which the medical profession is confronted.

2. Twenty-six possible sources of this condition are considered.

3. Peptic ulcer is responsible for approximately 50 per cent of the cases.

4. The problem of ascertaining the source of hemorrhage is considered.

5. The treatment of bleeding ulcer is discussed and preference is given to conservative treatment followed by delayed surgery.

6. The other sources of bleeding are briefly considered and their treatment discussed.

7. This study was made from a review of the cases of 122 patients ranging in age from 3 months to 86 years.

WHEN THROMBOPHLEBITIS is first observed, other signs and symptoms suggesting carcinoma may be absent. Robert H. Durham, M.D., Henry Ford Hospital, Detroit, believes that thrombophlebitis, particularly in a male patient over 35 years of age, warrants a presumptive diagnosis of visceral carcinoma until disproved.

The condition occurs most frequently with carcinoma involving the body or tail of the pancreas. However, the malignant lesion may be primary in any viscera, including the liver, lungs, stomach, gallbladder, or, more rarely, the urinary bladder, ovary, rectum, or uterus. The condition also is seen with asymptomatic leukemia.

The lesions of thrombophlebitis migrans are usually multiple and may involve any part of the trunk or extremities. An individual lesion affects only a short segment of the veins and is reddened, intensely inflamed, tender, and frequently fulminant. The lesions appear, gradually subside within two weeks or more, and recur along the course of the same or neighboring vein within a similar period. Fever and leukocytosis accompany each flare-up. In late stages, nonbacterial fibrinous vegetations develop on heart valves and commonly give rise to superficial arterial or pulmonary emboli.

The usually measured factors in coagulation, such as the sedimentation rate, thrombocytes, bleeding and clotting times, plasma fibrinogen, and prothrombin time are not sufficiently deranged to be causal in the thrombophlebitis. Liver function tests reveal no hepatic involvement.

The etiology of thrombophlebitis migrans is unknown. One theory presupposes the elaboration of a substance by the tumor cells which directly or indirectly influences the clotting mechanism. Also, since the condition occurs predominantly with carcinoma of the pancreas, mucolytic and other proteolytic enzymes may affect clotting. However, numerous attempts have failed to substantiate either hypothesis. A more complete analysis of the biochemical changes involved in the process is warranted.

ROBERT H. DURHAM: *Arch. Int. Med.* 96:380-386, 1955.

Fractures in the Region of the Knee

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FROM A practical standpoint, this subject should be entitled "Injuries in the region of the knee" because probably no joint is more exposed to the potentials of fracture which result only in soft tissue or cartilage injury.

No other injury, trivial or severe, calls for more careful evaluation and more acute judgment at the time of early treatment. No other injury, regardless of the age of the individual, carries such potentials for further difficulty. In spite of these gloomy remarks, the knee joint makes a remarkable functional recovery more often than any other joint, frequently confounding and confusing earlier judgments. However, such results are due to the remarkable ability of a joint to rehabilitate utilizing all the adjuncts at hand.

Therefore, I wish to emphasize the axiom that, with the exception of certain obvious conditions, conservative treatment is paramount when handling injuries about the knee.

THE CHILD

In this day of emphasis on early athletic participation, we see many youngsters complaining bitterly of diffuse pain in the knee which is sometimes associated with mild effusion, aggravated by strenuous effort, relieved by rest, and recurs on exertion. I can recall my own son crying at night with pain during the football seasons of his twelfth to fifteenth years. Pain caused by epiphyseal strain of the distal femoral epiphysis or pain at the tibial tubercles, with or without Osgood-Schlatter disease, must be differentiated from true incomplete fractures and requires early adequate evaluation and treatment.

Playground injuries, falls from the jungle gym, or automobile accidents causing direct blows against the distal femur with the knee flexed may result in avulsion of the anterior tibial spine. In such cases, there is a great temptation to open the knee and set the spine in place. This procedure is not necessary. The fragment is

situated in the intercondylar notch, and the knee may be fully extended and held, which reduces the fragment satisfactorily although not always perfectly. Functional union will occur and the knee rehabilitates after about a month of fixation. Mechanical disabilities may be cared for at a later date.

Trauma of the epiphyseal femoral or tibial plate may result in altered growth and the development of deformity. Early intervention is not wise as a rule. Correction may be accomplished later when the joint itself is rehabilitated. Delayed or stimulated growth in length may result from trauma of the epiphyseal plates. The ultimate result depends upon conservative judgment. Such a complication should be evident or apparent within one year. It does not occur after the age of physiologic arrest of the epiphyseal plate.

Before proceeding, I wish to call attention to a complication of almost all knee injuries. Effusion of the joint is invariably present. This effusion is noted in the suprapatellar pouch as an extension of the joint space. As it becomes more tense, the patient's ability to localize his areas of injury becomes obscured and the development of associated muscle spasm and capsular pain may cause confusion in the local examination and perplex the physician. Its late effects, especially when due to hemarthrosis, may delay rehabilitation. We feel that all traumatic effusions should be aspirated. Clear fluid rules out severe internal derangements; hemarthrosis is cause to suspect their presence; and a supernatant layer of free fat indicates the probability of intra-articular fracture communicating with the medullary cavity of adjacent bone. Aspiration should be delayed about twenty-four hours lest hemorrhage into the joint recur. The procedure should be repeated as necessary. Rehabilitation of the joint is markedly hastened thereby.

ADULT INJURIES

Much as I like the subject, I will avoid injuries of the menisci and ligaments of the knee except to state that they must not be overlooked when

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evaluating fractures of this area, and the principles of treatment directed toward them are part of the rehabilitation problem of the fracture. The presence of such injuries, early or late, may alter the rehabilitation program. The initial efforts must not be so enthusiastic that retreat is impossible. From such situations, a patient's criticism, lack of confidence, and occasional bitter reprisals may arise. The physician should be thankful for daily progress in the case, humble in his appraisal, and insistent that the patient use all his abilities to rehabilitate surrounding structures.

INJURIES OF THE QUADRICEPS EXTENSOR

Rupture of the quadriceps extensor, which is located proximal to the patella, is not an unusual occurrence in elderly persons and may be bilateral. Fracture of the proximal patella should be ruled out and the lesion repaired surgically, followed by careful rehabilitation.

FRACTURES OF THE PATELLA

1. Linear fracture. As a rule, no active treatment is necessary. The lesion must be differentiated from bipartite patella which often requires special patellar views for confirmation.

2. Simple transverse fracture within an intact envelope. After careful evaluation, early rehabilitation should be started with proper protection from stress and strain.

3. Simple transverse fracture with disruption of the envelope and quadriceps extensor. In the young adult, careful consideration should be given to the feasibility of preserving the whole patella by suture or eliminating a proximal or distal fragment and preserving a functioning remnant of the patella. Patellectomy may be the procedure of choice in some instances but should always be considered as a last resort, though the decision may be made early. At surgery, the patella is often found more comminuted than at first suspected. Good surgical sutures can aid early rehabilitation. Strong wire, not steel thread, should be used to encircle the patella. Wire can be removed later, but broken strands of inadequate steel thread are difficult to remove. If there is danger of infection, silk should never be used and removing silk is an endless process.

4. Comminuted fracture of the patella. This injury frequently occurs in the degenerated knee. If within the intact envelope, conservative treatment should be seriously considered with the realization that loose fragments within the joint may result. In the event this happens, later removal from an otherwise rehabilitated joint

is simpler than patellectomy. This judgment must be tempered with a full evaluation of the potentials of progressive degeneration of the joint, especially in an elderly individual in whom such degeneration may have already begun, and who may have had indications for patellectomy before the injury.

If associated with disruption of the quadriceps extensor, patellectomy is almost inevitable. Early rehabilitation should follow if a good suture of the extensor has been carried out.

5. Separation of the patellar tendon. With the exception of direct laceration, this lesion is almost always associated with fracture of the tibial tubercle. Surgical repair is necessary. Curiously enough, this lesion is often extra-articular, located distal to the synovial coverage of the infrapatellar fat pad. Adequate fixation should allow early and rapid rehabilitation.

INJURIES OF THE TIBIAL PLATEAU

With the exception of freak accidents, these injuries occur only at that age when resiliency of surrounding ligaments and reflex coordination are at low ebb and when bone structure is likewise more brittle and less resilient. They are seldom seen in children or young adults. Such injuries occur as a result of sheer stress and impact of one or the other femoral condyle, which has altered its relationship to the adjacent plateau by the release of supporting ligaments and continued its direct impact against the plateau either impacting it or splitting it like a blunt ax. Even when the lesion seems to be a simple linear fracture, usually associated comminution of the tibial chondral plate and the meniscus is present. Roentgenograms seldom fully demonstrate the degree of comminution.

These cases are seldom an emergency and are often not materially altered by surgery. Hemarthrosis should be resolved and traction applied with the aid of a snug fitting plaster from the groin to the toes. In this way, general alignment and compression of the deformity are restored. Of course, open reduction is required if a major fragment is widely displaced or impacted and resists the above procedure. In such cases, the joint may be opened and a displaced interposed meniscus is often found which must be removed. Fixation should be adequate by means of a lag screw or tibial bolt.

If joint comminution is severe, there is a temptation to remove articular fragments which may result in an unstable cavity with no weight bearing surface. Surgery is often unnecessary if the alignment of the circumferential weight bearing rim of the tibial plateau is carefully eval-

uated. This last point is especially true in the impacted type of tibial plateau fracture. This mass of comminuted chondral plate consolidates, and under conservative treatment, frequently leads to a surprisingly stable joint mechanism.

Subsequent valgus or varus deformities may not be very disabling if the supporting periarticular ligaments are restored and the quadriceps support is rehabilitated. Elderly people, who are no longer active, may not be troubled by this deformity. In younger persons, surgical elevation of the plateau by osteotomy and wedge bone graft insertion may be indicated but not often.

I have not mentioned fractures of the femoral condyles as I feel these are major fractures, and treatment of these injuries is well covered in the current literature.

I hope I have succeeded in emphasizing the facts that rehabilitation of a joint is a usual sequela of trauma, that the soft tissue injuries must not be overlooked, and that what is "seen" in a roentgenogram coupled with surgical enthusiasm is not the essence of surgical judgment, but rather an evaluation of the whole problem tempered by experience and the hard earned, often tragic lessons of others.

RECOGNITION of osteoblasts and osteoclasts in smear preparations of aspirated bone marrow may prove helpful in the differential diagnosis of metabolic bone disease, according to Michael A. Rubinstein, M.D., Cedars of Lebanon Hospital, Los Angeles.

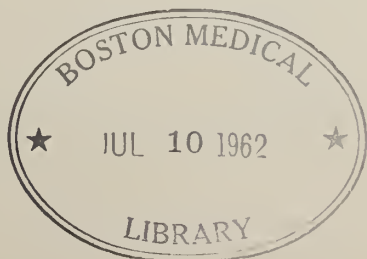
Osteoblasts, which are sometimes confused with plasma cells, reticulum cells, or tumor cells, appear as large, ovoid mononuclear cells with round nuclei which often appear to be extruded from the cytoplasm. Osteoclasts, which may be confused with megakaryocytes, are multinucleated syncytial forms. With experience, proper identification of these cells is not difficult. Metabolic bone diseases are associated with disturbances in equilibrium between the rate of bone formation and bone destruction. These disturbances are reflected in changes in number and proportion of osteoblasts and osteoclasts in bone marrow.

In Paget's disease of bone, osteoblasts and osteoclasts are both found in material aspirated from involved bone. Osteoblasts are more numerous when bone repair is active, while osteoclasts predominate in the state of osteoporosis circumscripta. Finding of osteoblasts differentiates osteitis deformans from metastatic malignant disease when roentgenologic evidence is inconclusive.

With hyperparathyroidism, both osteoblasts and osteoclasts are found, but osteoclasts are usually more numerous than with Paget's disease. If the patient has osteoporosis, material aspirated from bone marrow contains neither osteoblasts nor osteoclasts.

Osteoblasts may be found in bone marrow of healthy infants and of patients with Mediterranean anemia, sickle-cell anemia, osteosclerotic anemia, or osteoblastic metastatic cancer.

MICHAEL A. RUBINSTEIN: *California Med.* 82:440-443, 1955.





This department of THE JOURNAL-LANCET is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

Carcinoma of the Renal Pelvis

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CASE REPORT

E. N., a 67-year-old white male, was first examined in the Urological Clinic on August 30, 1954. During the preceding year, he noted several episodes of painless, gross, total hematuria of several days' duration, accompanied by increased frequency of urination. He never noticed blood clots, costovertebral angle pain, or suprapubic discomfort. Recently the hematuria was associated with chills and fever and, unlike the previous episodes, did not disappear after medication. Cystoscopy and retrograde pyelograms done elsewhere revealed a papillary tumor of the bladder with a left hydronephrosis and hydroureter.

His left foot was amputated fifty-five years ago after an accident. An appendectomy was performed twenty years ago. For the past ten years, he had symptoms of moderate spinal arthritis. A bleeding duodenal ulcer of four years' duration had been well controlled by a medical regimen. For two years, he had noted moderate dyspnea on exertion associated with "some tightness" of the chest.

Physical examination revealed a well-developed, well-nourished, cooperative white male with a blood pressure of 150/88, a pulse of 88,

and a temperature of 98° F. A mild cupping of the optic disks was present. The retinal vessels were tortuous, and minimum arteriovenous nicking was noted. The anteroposterior diameter of the chest was increased and was associated with a moderate pulmonary emphysema. The heart was normal. No masses were palpated in the abdomen or flanks. A scar in the right lower quadrant was well healed. The prostate gland felt small and benign. The genitalia were normal. He was admitted to the University hospitals on September 1, 1954.

The hemoglobin was 12.3 gm., and the leukocyte count was 8,350 with a differential count of 82 per cent polymorphonuclear leukocytes, 10 per cent lymphocytes, and 8 per cent monocytes. Serology was negative. The erythrocyte sedimentation rate was 81 mm. in sixty minutes. The urine was normal, but contained a coagulase negative staphylococcus. The blood urea nitrogen was 23 mg. per cent. Roentgenogram of the chest disclosed prominent bronchovascular markings, slight ectasia of the aorta, and a heart of normal size; there was no evidence of metastases. Excretory urography delineated a normal right kidney and ureter with a nonfunctioning left kidney. At cystoscopy, the prostate gland was small, and multiple papillary tumors surrounded and projected from the left ureteral orifice. These were resected transurethrally; the pathologist regarded the tumors as papillomas. A left pyeloureterogram revealed prostatic calculi, multiple

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Fig. 1. Filling defects in renal pelvis and ureter.

filling defects of the renal pelvis and ureter compatible with tumor, and a left hydronephrosis (figure 1). In spite of the use of antibiotics, he developed pain in the left flank, his temperature rose to 101°, and the leukocyte count to 18,000. This was presumably secondary to the trauma of catheterizing an infected left hydronephrosis.

On September 4, the left kidney and its fascia and surrounding fat, as well as the ureter down to the level of the brim of the pelvis, were removed through a modified Nagamatsu incision. Because of the age and general condition of the patient, removal of the remaining ureter with a cuff of the bladder was deferred. Recovery was relatively uneventful, and on September 14 the remaining ureter and a cuff of the bladder were removed extraperitoneally. He was discharged from the University Hospital on September 28, 1954. The pathologist reported a papillary carcinoma of the renal pelvis invading the parenchyma of the upper pole of the kidney; multiple small papillary tumors were present in the upper third of the ureter and one tumor in the intramural ureter. On December 12, 1954, extensive pulmonary metastases were observed in the roentgenogram of his chest (figure 2).

DISCUSSION

Tumors of the renal pelvis comprise 10 to 15 per cent of all renal tumors. Males are affected

3 times as often as females. About 4 per cent are bilateral. These neoplasms occur most frequently between the ages of 50 and 70 years.

The only symptom may be gross, mixed hematuria which persists over a period of months or years. The intermittent and usually painless bleeding may gradually become more severe and be accompanied by the passage of blood clots or, more rarely, a piece of tissue. The usually painless and intermittent nature of the hematuria probably accounts for the procrastination on the part of the patient and physician. The passage of clots may cause renal colic. Sometimes a dull ache is noted in the renal area. Frequency of micturition may be due to the presence of blood clots in the bladder or to a coexisting urinary infection. The tumor may cause obstruction and impaired renal function. It is interesting to note that after the cystoscopic examination, our patient developed left renal pain and a fever of 101° despite the use of antibiotics — the obvious diagnosis was an infected hydronephrosis.

Papillary tumors of the renal pelvis and ureter tend to grow slowly. The ureter and bladder (20 to 25 per cent) are frequently involved. Metastases to the lungs and liver occur late. A careful cystoscopic examination and good radiographic delineation of the kidneys and ureters are essential. The characteristic pyelogram dis-



Fig. 2. Extensive pulmonary metastases.

closes single or multiple filling defects in the renal pelvis, calyces, or ureter. Occasionally a tumor may be seen protruding from the ureteral orifice. All papillomas of the renal pelvis should be considered malignant since they are prone to transplant themselves and may even undergo malignant degeneration. Multicentric origin or implantation may account for multiple tumors in the renal pelvis, ureter, and bladder.

Squamous cell carcinoma of the renal pelvis is very malignant and usually fatal but, fortunately, is less common.

The treatment is nephroureterectomy with removal of a cuff of the bladder surrounding the ureteral orifice. If necessitated by the patient's condition, the procedure can be divided into two stages: the kidney and its surrounding fat and fascia and as much ureter as possible is

removed and its cut end coagulated at the first operation; later the remaining ureter and a cuff of the bladder is excised. Nagamatsu's incision with removal of the twelfth and sections of the eleventh and tenth ribs affords an excellent exposure without the complications which may attend opening the pleura. The intramural ureter may be excised with a resectoscope and at the time of ureterectomy the bladder is closed. Some coagulate the intramural ureter from above; the danger of implants in the wound is supposed to be less than with excision of the cuff of the bladder. Periodic postoperative cystoscopic examinations are necessary, since 20 to 25 per cent of papillomas of the renal pelvis are associated with vesical tumor. Since these tumors are radio-resistant, surgical removal is the only curative treatment.

REMOVAL of the entire colon and rectum through an abdominal incision is recommended by Laurence S. Fallis, M.D., and James Barron, M.D., Henry Ford Hospital, Detroit, for the surgical treatment of ulcerative colitis. Ileostomy may precede colectomy for patients with fulminating colitis; for patients with chronic recurrent or subacute disease, ileostomy and total colectomy may be performed at the same operation.

A left pararectal incision extending from the costal margin to the pubic crest is made. The colon and rectum are mobilized, with the perianal skin being cut across at right angles to the long axis of the rectum. A separate opening with a circular skin incision is used for the ileostomy, and the ileal mucosa is immediately sutured to the skin margin. A Rutzen bag is applied in the immediate postoperative period.

Total colectomy through an abdominal incision was performed for 20 patients with ulcerative colitis; no deaths occurred. The use of a single incision diminishes the loss of blood and reduces the trauma incidental to the classic perineal resection. Convalescence is rapid.

LAURENCE S. FALLIS, and JAMES BARRON: *West. J. Surg.* 63:452-455, 1955.

Lancet Editorial

Polio Ahead

ALTHOUGH the number of polio cases reported in the Upper Midwest in 1955 was less than half the average number of the previous five years, the states of Minnesota, North Dakota, South Dakota, and Montana will still have polio problems in 1956. The Salk vaccine has proved to be a major weapon against paralytic poliomyelitis, but it has not yet won the war against this disease.

Continuing cooperation of physicians must be had both in administering the vaccine and in caring for patients already paralyzed and *who will be* paralyzed in spite of the vaccine. The Salk vaccine is not 100 per cent effective and it will take considerable time, perhaps years, before all individuals most susceptible to paralytic poliomyelitis can be fully immunized against it.

The National Foundation for Infantile Paralysis, supported mostly through public contributions to its January March of Dimes, has made an enviable record, both in the Upper Midwest and nationwide, for meeting the problems posed by paralytic polio. In 1955, to initiate statewide vaccination programs, the March of Dimes gave nearly 239,000 cc. of Salk vaccine without charge to the state of Minnesota; 38,000 cc. to North Dakota; 33,000 cc. to South Dakota; and 26,000 cc. to Montana.

The results already reported from the use of the vaccine in Minnesota and elsewhere are most encouraging, but they must not be allowed to blind the eye of the medical profession to the road that still lies ahead. A great need remains for additional research to improve the Salk vaccine, to determine the duration of immunity it effects (and conversely to determine the need for "booster shots"), and to provide the best possible treatment for patients already or yet to be afflicted with paralytic poliomyelitis. There is also a vast need for the professional education of young men and women who will contribute

to the necessary research and help give the needed treatment.

To pay for research, education, and aid to polio patients, the March of Dimes needs \$47,600,000 in 1956. Physicians in the Upper Midwest, knowing both the need and the record, will want to support and urge their patients to support the 1956 March of Dimes.

A brief review of the record of the National Foundation for Infantile Paralysis in the Upper Midwest, where it has 89 local chapters in Minnesota, 53 chapters in North Dakota, 67 chapters in South Dakota, and 56 chapters in Montana, should help to orient physicians to the many services to patients and professions which the March of Dimes has made possible since 1938, when the National Foundation was founded.

Over \$9,710,000 has been spent by local chapters in Minnesota for the care of polio patients; in North Dakota, \$970,000; in South Dakota, \$1,750,000; and in Montana, \$940,000.

The University of Minnesota has had \$1,465,000 in March of Dimes grants, including \$681,000 for virus research, \$487,000 for research in after-effects of poliomyelitis, and \$297,000 for professional education. The University of North Dakota also received a March of Dimes grant for poliomyelitis prevention.

A total of 161 National Foundation scholarships and fellowships has been awarded to Minnesota residents, 23 to North Dakota residents, 13 to South Dakota residents, and 18 to Montana residents.

Emergency aid in dollars and in equipment for polio patients has been generously supplied to the Upper Midwest. In the first 10 months of 1955, for example, a total of \$127,025 in emergency aid was sent to 18 Minnesota chapters by the national headquarters of the National Foundation. In the year 1954, the amount provided to 51 chapters was over \$692,700.

HART E. VAN RIPER, M.D.

Psychocutaneous Medicine, by MAXIMILIAN E. OBERMAYER, M.D. Publication No. 239, American Lecture Series, monograph in Bannerstone Division of American Lectures in Dermatology, edited by Arthur C. Curtis, M.D., 1955. Springfield, Illinois: Charles C Thomas. 487 pages. \$9.75.

Progress in the development of new psychiatric techniques and methods of study of psychosomatic disorders has stimulated much interest in the role of the psyche in many diseases. The author of this monograph has long stressed the importance of emotional factors in many dermatoses. He believes that since organic diseases are now better understood, it becomes possible to differentiate them more accurately from functional disorders. In order that the reader may better understand the fundamental factors involved in a study of the psyche, an eminent psychiatrist has written a chapter on these aspects, in which he explains the basic concepts of psychiatric studies.

The author then presents his theories regarding psychosomatic relationships in skin diseases based on several fields of investigative studies. He classifies various dermatoses into several groups based on the degree of influence of psychic factors involved in each disease.

The first group, which includes



some of the milder neurotic disturbances, as well as the phobias and self induced disorders and delusions, is called the "True Dermatoneuroses." Skin diseases in which he believes emotional factors play an important role are included in the second group. The next group consists of dermatoses, which includes associated psychic factors. Some viral, pyogenic, and venereal infections constitute the next category in his classification. He then discusses the association of certain skin diseases in the various psychoses. The author emphasizes the importance of a careful diagnostic approach in attempting to evaluate whether or not a given dermatosis is influenced or caused by psychosomatic factors. The last chapter concerns treatment, both by the dermatologist and the psychiatrist. He believes that the dermatologist is capable of giving good superficial psychotherapy. How-

ever, the more involved cases and those patients with longstanding and complicated emotional difficulties are better handled by the psychiatrist, either alone or in some instances in close collaboration with the dermatologist.

Dr. Obermayer, because of his training, interest, and vast experience, is particularly well fitted to discuss the psychosomatic aspects of dermatology. Although some of his theories are controversial, much of the material in this book will prove very helpful not only to dermatologists, but also to psychiatrists.

ELMER M. HILL, M.D.

Pregnancy Wastage, edited by EARL T. ENGLE, 1953. Springfield, Illinois: Charles C Thomas. 254 pages. \$8.50.

This book is one of the series of recorded proceedings of the conferences sponsored by the Committee on Human Reproduction of the National Research Council. It consists of a series of monographs concerning the principal causes, as understood at present, of prenatal and neonatal fetal loss. The discussions which followed presentation of the papers at the conference are reported and, in some instances, are as valuable as the formal papers themselves. This is a basic reference monograph for workers in the field.

IRWIN H. KAISER, M.D.

American College Health Association . . .

SECTION ACTIVITIES

Officers elected for 1956 at the December 2 and 3 meeting of the Pacific Coast Section, held at Santa Barbara, California, are as follows:

President, Glen R. Leymaster, M.D., University of Utah; president-elect, Gertrude Huberty, M.D., University of California, Los Angeles; secretary-treasurer, Ruby Rich Burgar, R.N., Occidental College; member-at-large, Evelyn G. Clark, R.N., Whittier College.

Dr. John W. Brown, president of the American College Health Association, attended the Pacific Coast meeting.

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The annual meeting of the New England Section of the American College Health Association was held at Wesleyan University in Middletown, Connecticut on December 3, 1955, under the chairmanship of Dr. Bryant M. Wedge, Yale University. Dr. Clair B. Crampton of Wesleyan was host, and 36 representatives were present at the meeting.

At the business meeting, Dr. Samuel E. Leard, Boston University, was elected chairman of the New England Section for 1956.

The next meeting was tentatively scheduled for December 1, 1956, at the Boston University Conference Center at North Andover, Massachusetts.

PERSONNEL

Otto J. Keller, M.D., director of the Student Health Service at Northern Illinois State Teachers College in De Kalb, Illinois, has been elected president of the De Kalb County Medical Society for 1956.

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Wilson F. Dodd, M.D. has been appointed medical director for Union Theological Seminary in New York City. From 1943 to 1945 he was director of medical work for 5 refugee camps of over 50,000 people under the UNRRA in Egypt and Palestine.

ACHA COMMITTEES

Dana L. Farnsworth, M.D., Harvard University, chairman of the Committee on Records announces the following additions to his committee:

Dr. D. B. Chamberlain, Bowling Green State University; Dr. Frances Stewart, University of Toronto; Dr. Paul Schumacher, Miami University; Dr. Margaret G. Zeff, University of California at Berkeley; Dolores Marshall, R.N., University of Denver; and Mrs. A. O. Kiesow, University of Kansas.

.

William T. Palchanis, M.D., Ohio State University, should be included in the membership of the Committee on Tuberculosis.

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News Briefs . . .

North Dakota

THE UNIVERSITY OF NORTH DAKOTA SCHOOL OF MEDICINE has received a total of \$54,106 in new grants for research and teaching since July 1, 1955. Of this amount, \$32,911 was given by the Public Health Service. Other sources were the American Medical Association, American Heart Association, Bremer Foundation, and the Lipotropic Research Fund.

DR. WILLIAM E. CORNATZER, head of the biochemistry department at the University of North Dakota School of Medicine, has been asked by the United States Atomic Energy Commission to serve as consultant at the Oak Ridge Institute of Nuclear Studies. The Atomic Energy Commission has also approved a grant for Dr. Cornatzer's studies on effects of radiation on cells of various organs.

DR. JOHN H. MOORE, Grand Forks, has accepted an appointment as consultant in obstetrics to the North Dakota health department to assist in a research program. This program, sponsored by the health department in co-operation with the state medical association and the society of obstetrics and gynecology, is for added research to further reduce the maternal mortality rate in North Dakota, already one of the lowest in the nation.

DR. W. A. WRIGHT was named one of the directors of the North Dakota Heart Association at their recent meeting in Grand Forks. Officers are: president, Dr. R. O. Gochl, Grand Forks; vice president, Dr. T. H. Harwood, dean of the University of North Dakota Medical School; secretary, Dr. C. H. Peters, Bismarck; and treasurer, Charles Tighe, Bismarck.

DR. ROBERT E. LUCY, Jamestown, and DR. WALLACE W. NELSON, Grand Forks, were inducted into fellowship in the American Academy of Obstetrics and Gynecology during the annual clinical meeting of the organization in Chicago, December 12 to 14.

DR. ROY LYNDE was honored recently by the community of Ellendale for his fifty years of medical practice. The celebration took place at the ball park, at which time the athletic field was named after Dr. Lynde. The program ended with a night baseball game.

DR. OLAF A. KNUTSON, of Buxton, was honored recently for his fifty years of service to the community. Friends presented Dr. Knutson with a gold watch.

DR. PERRY ENGSTROM has joined the staff of the Red River Valley Clinic in Wahpeton. Dr. Engstrom comes from Pennsylvania.

Minnesota

A MEMORIAL FUND to honor deceased physicians has been established at St. Luke's Hospital, Duluth. The late Drs. S. H. Boyer, Sr., and Robert Nelson are the first two persons memorialized in the fund. Donations will be used to purchase equipment for the medical staff, especially in the field in which the physician being honored was interested.

THE UNIVERSITY OF MINNESOTA is to share in a \$355,000 grant from the tobacco industry research committee for studies on the relationship between the use of tobacco and health. Dr. Ancel Keys, director of the laboratory of physical hygiene, and Dr. Josef Brozek, associate professor in the laboratory, are 2 of 19 researchers to share the grant. Dr. Brozek will make a study of people who

(Continued on page 28A)



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1. Cass, I. J. and Frederik, W. S.: Malt Soup Extract as a Bowel Content Modifier in Geriatric Constipation. *Journal-Lancet*, 73:414 (Oct.) 1953.

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- Hence, reserpine is not the total active antihypertensive principle of the rauwolfia plant.
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1. Cronheim, G., and Toekes, I.M.: Comparison of Sedative Properties of Single Alkaloids of Rauwolfia and Their Mixtures, Meeting of the American Society for Pharmacology and Experimental Therapeutics, Iowa City, Iowa, Sept. 5, 1955.

2. Moyer, J.H.; Dennis, E., and Ford, R.: Drug Therapy (Rauwolfia) of Hypertension. II. A Comparative Study of Different Extracts of Rauwolfia When Each Is Used Alone (Orally) for Therapy of Ambulatory Patients with Hypertension, A.M.A. Arch. Int. Med. 96:530 (Oct.) 1955.

Riker

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NEWS BRIEFS

(Continued from page 26A)

smoke. Drs. Keys and Bronte Steward, assistant professor of medicine at the University of Cape Town, South Africa, will make a series of studies of populations and heart diseases in Japan and Finland, emphasizing the relationship of smoking to such diseases.

• • • • •

ST. JOHN'S INSTITUTE FOR MENTAL HEALTH at Collegeville has received, for the third successive year, a grant from the Hamm Foundation of St. Paul. The grant will support the institute's summer workshops for clergymen of all faiths to study mental health problems. Officials have described the workshops as an experimental attempt "to translate the theory and language of the contemporary science of healing sick minds into the terms of pastoral care and religious experience."

• • • • •

DR. ROBERT A. GOOD, American Legion professor at the University of Minnesota, won top honors in his field on two occasions within three months. He was awarded the 1955 Theobald Smith award of \$1,000 and a bronze medal at the annual meeting of the American Association for Advancement of Science in Atlanta. In October, Dr. Good received the E. Mead Johnson award for pediatric research at the annual meeting of the American Academy of Pediatrics.

• • • • •

DR. JOHN S. LUNDY, professor of anesthesiology in the Mayo Foundation, has been named a corresponding member of the Association of Anaesthetists of Great Britain and Ireland. Founder of the Section of Anesthesiology at the Mayo Clinic in 1924, Dr. Lundy is also a member of the Cuban National Society of Anesthesiology, the French Society of Anesthesia and Analgesia, and a corresponding member of the Havana Society of Anaesthesia. In 1948, he received the distinguished service medal of the American Society of Anesthesiologists.

• • • • •

DR. FRANK H. KRUSEN has been elected president of the International Federation of Physical Medicine and will preside at the federation's next congress in Copenhagen, Denmark, in August, 1956. Recently, Dr. Krusen also received the Modern Medicine award for distinguished achievement. He is head of physical medicine and rehabilitation at the Mayo Clinic and professor of physical medicine and rehabilitation in the Mayo Foundation.

• • • • •

DR. FREDERICK J. MOERSCH, senior consultant in neurology at the Mayo Clinic and professor of neurology in the Mayo Foundation, has been elected president of the American Board of Psychiatry and Neurology. Dr. Moersch retired from active practice in 1954 but has remained at the clinic as a special consultant.

• • • • •

AT THE ANNUAL MEETING of the board of governors of the Mayo Clinic, all officers were re-elected. They are: chairman, Dr. Samuel F. Haines; vice chairman, Dr. James T. Priestley; second vice chairman, Dr. Hugh R. Butt; and secretary, Mr. H. W. Harwick.

• • • • •

DR. H. P. LINN was honored recently by the board of trustees of Swedish Hospital, Minneapolis, on which he served since 1926 until his retirement in 1955.

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DR. GEORGE L. WADSWORTH, former manager of the Veterans Administration Hospital at Roseburg, Oregon,

is the new superintendent of the Anoka State Hospital. Dr. Wadsworth succeeds Dr. John Reitmann who resigned for further psychiatric study.

DR. GEORGE M. HIGGINS, staff member of the Mayo Clinic since 1924, retired December 31. A senior consultant in the Anatomy Section of the clinic since 1952, Dr. Higgins is known for his numerous investigations into the fields of experimental biology related to medicine.

South Dakota

DR. LAWRENCE G. CHRISTIANSON has been named chief of the department of internal medicine at Fort Meade Veterans Administration Hospital. Prior to his appointment at Fort Meade, Dr. Chistianson was in private practice at Greeley, Colorado.

DR. P. S. NELSON, formerly engaged in medical practice in Montana, has joined the staff of the Redfield Clinic.

DR. CHARLES D. YOHE has resigned his position as superintendent of the Yankton State Hospital. His resignation became effective February 1. Dr. Yohe has been head of the hospital since June 1953.

Deaths . . .

DR. GEORGE H. HOLT, 76, pioneer physician and surgeon at Jamestown, North Dakota, died December 10. Dr. Holt practiced in Jamestown since 1909.

DR. STEPHEN H. BAXTER, 77, Minneapolis physician and former president of the Minnesota Medical Association and Hennepin County Medical Society, died December 7. Dr. Baxter was also former director of Franklin Hospital and senior surgeon at Abbott Hospital for many years.

DR. HARRY H. BOWING, 71, former Mayo Clinic radiologist and University of Minnesota professor, died December 8. President of the American Radium Society in 1930, Dr. Baxter was a specialist in the radium treatment of cancer.

DR. WILLARD S. HOWARD, 66, St. Paul physician, died December 17. Dr. Howard was St. Paul post office physician from 1929 to 1946, and since then has been associated with the Veterans Administration at Fort Snelling.

DR. ROLV S. HEGGE, 53, physician and surgeon in Austin, Minnesota, died December 3 from complications of encephalitis. Dr. Hegge was Mower County health officer from 1945 to 1954.

DR. A. V. DENMAN, 74, physician in Mankato, Minnesota, for thirty-five years, died December 5. Dr. Denman retired from active practice in 1953 and has made his home in Oakland, California, since that time.

DR. V. V. KOBZA, 41, a specialist in obstetrics and gynecology in Rapid City, South Dakota, died December 16. Dr. Kobza was head of the department of obstetrics and gynecology at St. John's and Memorial hospitals, Rapid City.

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Surgical Technic, Two Weeks, March 19, April 2.
Surgical Anatomy and Clinical Surgery, Two Weeks, March 5.
Surgery of Colon and Rectum, One Week, April 9, May 7.
General Surgery, Two Weeks, April 23.
Basic Principles in General Surgery, Two Weeks, April 9.
Gallbladder Surgery, Ten Hours, April 9.
Fractures and Traumatic Surgery, Two Weeks, March 12.
Varicose Veins, Ten Hours, March 19, April 30.

GYNECOLOGY—

Office and Operative Gynecology, Two Weeks, March 12, April 16.
Vaginal Approach to Pelvic Surgery, One Week, March 5, April 30.

OBSTETRICS—General and Surgical Obstetrics, Two Weeks, March 26, May 7.

MEDICINE—

Internal Medicine, Two Weeks, May 7.
Electrocardiography and Heart Disease, Two-Week Basic Course, March 12.
Gastroscopy, Forty-hour Course, March 19.
Dermatology, Two Weeks, May 7.

RADIOLOGY—

Diagnostic X-ray, Two Weeks, April 30.
Clinical Use of Radioactive Iodine, One Week, April 2.
Clinical Uses of Radioisotopes, Two Weeks, May 7.

PEDIATRICS—

Intensive Review Course, Two Weeks, May 14.
Neurological Diseases: Cerebral Palsy, Two Weeks, June 18.

UROLOGY—Two-Week Course, April 16. — Cystoscopy, Ten Days, by appointment.

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Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.

• "Cardiac Surgery — A Brief Review" by F. John Lewis, M.D., of the departments of surgery, Ancker Hospital, St. Paul, and the University of Minnesota Medical School, presents in anatomic order the most beneficial operations in use at the present time. Extracardiac lesions, the first to be treated surgically, are described first; followed by valvular defects, septal defects, and a final section on coronary insufficiency.

• In the last quarter of a century, concepts concerning the problem of tuberculosis have been profoundly influenced by (1) public education, (2) decline in the death rate, (3) prophylactic vaccination, (4) chemotherapy, (5) research in the life processes of the tubercle bacillus, and (6) use of surgery either to collapse a lung or to resect an area of pulmonary disease. The way in which basic pathologic facts are related to these events are discussed in "The Behavior of Pulmonary Tuberculosis — A Pathological Study" by E. M. Medlar, M.D., reprinted from *American Review of Tuberculosis and Pulmonary Disease*. The study closely examines thinking on the part of the clinician, surgeon, epidemiologist, and public health officer in an endeavor to direct investigative efforts to pathologic problems encountered in these fields.

• In many areas, the mass x-ray survey for the detection of tuberculosis is obsolete. Its greatest value is its periodic use among tuberculin reactors. The magnitude of the tuberculosis problem can only be determined by universal tuberculin testing. The paper entitled "30,000 per 100,000" by J. A. Myers, M.D., chairman of our board of editors, refers to the present case rate in this country. The first basic step toward reducing this rate should be to test the entire population with tuberculin. Increased funds, more workers, and greater cooperation among our citizens are required to accomplish this momentous task, but it is indispensable if tubercle bacilli are to be completely eradicated.

• The efficacy of the various drug combinations that are now available for the treatment of tuberculosis are discussed in "The Current Status of the Therapy of Tuberculosis" by Abraham Falk, M.D., assistant professor of medicine, University of Minnesota. Modern therapy offers the advantage of shorter hospitalization, an earlier return to productive activity, and greater assurance that a relapse will not occur.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA POSTGRADUATE COURSES

A course in Endocrinology for General Physicians will be held April 9 to 11. Management of common endocrine and metabolic abnormalities will be stressed. Guest speaker will be Dr. Peter H. Forsham, associate professor of medicine and pediatrics, University of California. Director of the course will be Dr. C. J. Watson, professor and head, Department of Medicine.

A course in Gynecology for Specialists will be presented April 12 to 14. The course will be under direction of Dr. John L. McKelvey, professor and head, Department of Obstetrics and Gynecology.

A course in Radiology will be given April 16 to 18. Registrants will have an opportunity to interpret films and carry out certain techniques under supervision of qualified instructors. Early application is essential as attendance will be limited.

PROCTOLOGISTS TO MEET

The International Academy of Proctology will hold its annual convention in the Drake Hotel, Chicago, April 23 through 26. Major developments in the field will be covered with emphasis on anorectal diseases. For further information, write the secretary, Dr. Alfred Cantor, 147-41 Sanford Ave., Flushing 55, New York.

CLINICAL REVIEWS

A 3-day program entitled "Clinical Reviews" will be held at Rochester, Minnesota, April 9 through 11. Presentations will be given by staff members of the Mayo Clinic and Mayo Foundation. Lectures and discussions will cover problems of current interest in general medicine and surgery. There are no fees. Accommodations are limited. Those wishing to attend should communicate with Mr. R. C. Roesler, Mayo Clinic.

★

The Section on Pain scheduled for the April issue will be postponed to make room for a Special Issue on Diseases of the Chest. The Section on Pain will appear in the May issue.

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*Lawrence, E. D.; Doktor, D., and Sall, J.:
Angiology 2:405, 1951.

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Bronchologic Methods in Pulmonary Diagnosis

JEROME A. HILGER, M.D.
St. Paul, Minnesota

MOST PULMONARY DISEASES, other than those incurred through the hematogenous route, tend to follow the distribution of the bronchopulmonary segments. The classical teaching of the past demonstrated that the lung bud differentiated into 3 major bronchi on the right and 2 on the left. Hence, man is endowed with 3 pulmonary lobes right and 2 left. The subject was pursued no further, and physical diagnosis was taught on that basis. The astute clinician no longer contents himself with a viewpoint so gross. As the secondary and, to a more limited extent, the tertiary bronchi have come within specialized diagnostic range, it has been satisfying to note that early disease is commonly focalized in these more discrete bronchopulmonary segments to extend only later into the gross lobar pattern. In many of the more pernicious pulmonary diseases, as typified by cancer and tuberculosis, clinical response is directly related to the stage of diagnosis. It is better, therefore, that disease be identified when involvement is of the smallest possible segment rather than after upward extension to a major lobe. Discovery of disease in the former can be a diagnostic triumph — in the latter, it is more often a case of tripping over the obvious.

Most lung pathology is betrayed by symptoms. The commonest are cough, dyspnea, wheeze, and hemoptysis. As the annual chest roentgenogram

is incorporated into physical examination routines in the after 40 age group, the symptomless shadow is becoming a fruitful source of early suspicion.

In the evolution of diagnostic methods in lung examination, new technics have supplemented and occasionally replaced the old. Today more can be done to identify the nature of the disease process than ever before. The enthusiasm for new approaches is common in all of us. However, they should never replace the basic first requisites of pulmonary diagnosis. These and the newer technics can be placed in an orderly sequence. The purpose of this paper is to outline such a plan.

When symptoms or routine findings suggest a lung lesion that requires study — whether the indicator is shadow, cough, hemoptysis, or some other symptom — the first need is for a thorough history and general examination with all the necessary laboratory studies for related systemic disease. Too often the tendency is to focalize immediately upon the lung. An extensive bronchologic investigation for the cause of hemoptysis in a patient who proves to have leukemia is an example of detrimental regress rather than of progress.

The standard chest film should be supplemented by necessary additional x-ray studies as suggested by the roentgenologist. Sometimes special angle films, inspiration and expiration films, or body section roentgenograms are warranted.

Indicated intradermal tests should be applied.

JEROME A. HILGER, a 1936 graduate of the University of Minnesota, is clinical professor of otolaryngology at the University of Minnesota.

These may be the tuberculin test or preparations from higher organisms such as histoplasmin.

Sputum studies are the next proper step. They are still as correct as they are venerable. These studies of smears and proper cultures have been supplemented by cytologic examination in recent years. This latter technic is a well-proved adjunct and should be used more routinely than is the usual tendency. A consulting cytologic pathologist is as available to any diagnostician as is his morning mail. This sputum phase of the pulmonary study is not complete without his help. Successive morning sputum specimens collected in special media at his direction and forwarded to him can bring prompt reply that suspicious cells are present or absent. Some series demonstrate 2 out of 3 lung cancers identified by this method.

When diagnosis is not completed by the foregoing methods or when findings indicate the need for further definition, bronchoscopic examination is necessary. With adequate tubes and telescopes, all major and secondary bronchial divisions are in view. Distortions, pathology, and secretions can be seen and interpreted. More than 50 per cent of bronchial carcinomas are within range of biopsy. In addition, abrasion of more peripheral bronchial surfaces with suitable flexible shafts and the collection of aspiration and irrigation material direct from the periphery of involved segments give the cytologic pathologist an excellent specimen for study. Additional material is sent to the bacteriology laboratory. At the completion of this direct examination, a catheter is placed, if necessary, and bronchographic studies are immediately done. This single package procedure minimizes the inconvenience to the patient and produces a maximum of information.

When this full sequence does not suffice to define the nature of a lung density and when the process is focalized in the upper pulmonary segments, supraclavicular biopsy is indicated. The lymph nodes in the supraclavicular area near the

convergence of the major lymphatic trunks are readily accessible through a modest incision above the clavicle. A specimen of areolar tissue and nodes is removed, sectioned, and studied in the routine manner. Noncaseating granuloma (sarcoid) is identifiable by this technic when no other method provides the diagnosis. The procedure is done with local anesthesia. It is not disabling and can be performed immediately after the completion of an uninformative bronchoscopic examination and thereby minimize investigative time and expense.

This sequence of study places first methods first and keeps a proper relationship between the old and the recent methods of diagnosis. Nevertheless, a significant number of pulmonary symptoms and lesions defy diagnosis. In some, a period of intelligent observation and serial roentgenogram study are warranted. In some, an exploratory thoracotomy is indicated. All lesions are hereby accorded a respectful and thorough study, however.

Some fundamental errors do occur which should be decried. Several of the more common are noted for emphasis:

1. Pulmonary symptoms should not be interpreted without an adequate roentgenogram.
2. Cell study or bronchoscopic examination should be pursued further when significant symptoms or physical findings persist in the presence of a normal roentgenogram.
3. In general, adherence to the above sequence is preferable to placing last methods first.
4. A patient who has an abnormal roentgen pulmonary shadow on one examination should not be reassured because symptoms and physical signs subsequently clear. Follow-up x-ray studies are a must until the density resolves completely. Bronchial carcinoma frequently initiates recurrent distal pneumonitis. No credit is gained by diagnosing the primary carcinoma after the third pneumonitis. The slow or incomplete resolution of the first episode should be enough to initiate an investigative sequence.

The Diagnostic Process

From the book *Psychiatry For The Family Physician**

C. KNIGHT ALDRICH, M.D.

Chicago, Illinois

APPROPRIATE treatment of any patient must always evolve from a positive diagnosis. Emotional illness is no exception to this rule. It requires a positive diagnosis and cannot be diagnosed simply by the absence of pathological findings on physical examinations or laboratory tests. Diagnosing hypochondriasis by exclusion is just as inaccurate as diagnosing lung cancer solely because the physician cannot find evidence of tuberculosis, pneumonia, bronchiectasis, or anything he can think of except cancer that might be causing a cough.

Thus, the fact that Dr. Wilson could not find evidence of gallbladder or any other organic disease to explain Mrs. Brown's attacks of abdominal pain did not in itself mean that her emotions caused her illness, although it naturally suggested that possibility to Dr. Wilson. No matter how many laboratory tests turn out to be negative, a patient remains a diagnostic problem until the doctor makes a positive diagnosis.

Diagnosis of emotional illness simply by the apparent exclusion of organic disease may delay definitive diagnosis and treatment. In some cases, the delay jeopardizes a patient's chances for recovery.

The positive diagnosis of emotional illness depends primarily on an appropriate evaluation of three determinants: (a) the nature of the patient's symptoms and their resemblance to patterns found in emotional illness, (b) the synchronization of onset, increase, or decrease of symptoms to environmental stress or changes in the patient's adaptive capacity, and (c) the influence of any coexisting or contributory conditions, such as organic illness. The physician's ability to make a positive diagnosis depends, therefore, on his skill in taking a medical history which gives proper emphasis to emotional factors and on his familiarity with psychopathology as well as organic pathology.

To reinforce a positive diagnosis, the doctor

should understand the structure of the emotional illness. He should be able to recognize signs of disturbed equilibrium of psychological forces — specifically, distorted evaluation of the environment and inadequate inhibition and facilitation of impulse expression. He should have some knowledge of the strengths and weaknesses of the patient's adaptive functions as demonstrated by response to stress in the past. His diagnosis becomes more specific if he understands the development of his patient's personality and levels of partial fixation and regression. The physician should know what special meaning the events that precipitated the illness had for the patient. He should also attempt to determine, in terms of past interpersonal relationships, the patient's capacity to respond to psychotherapy.

The physician cannot, of course, determine all the structural and developmental characteristics of an emotional illness from the first interview. His diagnosis becomes more accurate and more sharply defined as further interviews reveal new facets of the patient's personality.

Meanwhile, the physician must demonstrate the relationship of the emotional illness to the patient's symptoms. Neurotic patients are no more immune to organic disease than anyone else, and a doctor's assumption that all of a hypochondriac's complaints are due to his hypochondriasis may be disastrous. Complicating the diagnostic process is the hypochondriac's tendency to overreact to organic illness so as to obscure the underlying cause. Illness, as we have seen, is a source of anxiety and perhaps of depression to many patients, but in most cases the sequence of events is quite clear. When the degree of emotional reaction is great, however, as it usually is in chronically psychoneurotic patients, it may overshadow the symptoms of the precipitating organic illness. For example, if Mrs. Brown should develop appendicitis, her reaction could so simulate her previous emotionally precipitated attacks that an unwary Dr.

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Wilson might conclude that no examination was necessary. The physician, therefore, should learn all he can about the onset of an illness and of any exacerbations, paying particular attention to the emotional as well as the physical milieu in which it originated. The precipitating event may be the key to the underlying problem; thus, although Dr. Wilson's diagnosis was not established by finding that Mrs. Brown's first attack followed her discovery of her husband's infidelity, this finding was an integral part of the diagnostic process.

As far as possible, diagnosis must be the prelude to treatment, and treatment begun prematurely may obscure the diagnostic process. Generally, in medicine, we violate this rule only in an emergency, as when we give an antibiotic for an overwhelming infection before cultures can reveal the causative organism. Both diagnosis and treatment of emotional factors in illness, however, are carried out through the same medium — the doctor-patient relationship. Since the physician's attitude and comments during the history taking will inevitably reassure, encourage, frighten, antagonize, or in some other way affect his patient, the diagnostic and treatment processes tend to merge and cannot be completely separated. Whether the doctor wants to or not, he does influence the course of a patient's emotional illness by his diagnostic efforts.

He also influences the patient's attitude toward later, more specific treatment efforts. If, while making a diagnosis of emotional illness, he overemphasizes organic possibilities, and particularly if he frightens the patient unnecessarily, he encourages the patient's preoccupation with organic illness and makes eventual psychological therapy more difficult. On the other hand, if he conveys to the patient his attitude of understanding and respect for emotional illness, he gives him a head start toward treatment. The patient's attitudes are guided by the attitudes of his physician; if the physician shows interest in all aspects of his condition, including the emotional, it is easier for the patient to overcome his own resistance and look at his feelings.

A patient who rationalizes anxiety as organic illness, displaces anxiety to a part of his body, or converts anxiety into a physical symptom avoids facing the cause of his anxiety. If he gives up his rationalization, displacement, or conversion, he gives up his protection, as he conceives it, and comes one step closer to facing danger. It is, therefore, not surprising that he fights off the recognition of emotional factors in his illness. The physician should anticipate this fear of feelings, and whenever he suspects that

emotional factors are present, should conduct his diagnostic process in a way which will establish the most favorable field possible for future treatment efforts. This requires him to keep in mind possible emotional causes as well as possible emotional effects from the time of his first encounter with any patient who presents a diagnostic problem.

At the beginning of a medical history the physician should encourage the patient to describe his illness in his own words. He should listen carefully and observe the patient's tone of voice, facial expression, and any other signs of emotion. He notes for later exploration any pertinent relationships, events, or feelings which the patient appears to avoid or to overemphasize. Meanwhile, he confines his own activity to unobtrusive words or gestures which show his interest. As he evaluates the symptom picture, he looks for precipitating factors. These may develop spontaneously: "I can remember what night it was — just after that awful row with my husband," or "I'd had pork chops and cabbage for dinner"; or uncovering the precipitating factors may require later questioning. Direct questions, however, are not so effective in eliciting a history of emotionally charged events as they are in more neutral areas of investigation. A patient who will give a reliable answer to the question, "Had you been eating fried food or cabbage before the attack?" may dissemble or avoid a direct answer if the question is "Had you been having trouble with your husband before the attack?" Fearing criticism, many patients hesitate to confide personal troubles to their physicians and need to test the reception they will receive by exposing a small portion of the problem at a time.

Relatively vague questions which permit the patient a choice as to how much he will tell (if, of course, there is anything to tell) are best, such as "What was your situation in general at the time your symptoms began?" The patient may then describe a significant stressful situation, or he may indicate that things were going along about as usual, or he may ask what the question means. At this point, "I mean how were you getting along with your husband?" may be too direct and limiting. "I mean how were things at home, at work, and so on?" is still general enough to encourage the patient to discuss sources of tension which he thinks are important. The answer to this question may give the physician the impression that emotional factors are not particularly significant in the patient's illness, or it may supply clues to possible areas of stress which he may decide to follow up then

or later, depending on the patient's attitude. If the patient replies "Why do you ask?" the physician need not evade or apologize, but should face the patient more directly with such a question as "Well, I was wondering if you felt that there was any nervous tension at home or at work which might be aggravating your symptoms." Some patients at first interpret a doctor's implication that emotions might be *causing* symptoms to mean that he thinks they are *imagining* them. However, they seldom resent questions as to the *effects* of tension or "nervousness" on their condition, and often volunteer this information when the doctor asks what they have found brings on attacks or aggravates symptoms.

Sometimes a patient's own concept of what is wrong with him can help the physician in diagnosis and later management. For instance, if the physician says, "This has troubled you for some time now; I wonder if there's anything in particular that you've worried about, or what you've thought your illness might be," he will be helped by any of the following answers:

"Doctor, I've been terribly afraid it might be cancer" warns him that he must be specifically reassuring if no cancer is found, or that the presence of cancer would be an unusually threatening finding to this particular patient.

"I've wondered if it couldn't be my nerves" indicates that emotional factors can be explored more freely than usual. An overenthusiastic acceptance of a diagnosis of emotional illness, however, may hide a deeper fear of organic disease.

"I've looked it up in my home medical book and I think it's shingles" reminded one physician of a diagnosis he had not considered.

"I think it's all due to the fall I had while working at the plant" may warn the physician of possible workman's-compensation considerations.

Even, "You're the doctor; you're supposed to tell me" enlightens the physician as to his patient's personality. If he knows the patient or cultural pattern well enough to anticipate this type of response, he should omit the question.

The physician is interested in the patient's record of previous treatment as well as his diagnostic ideas. This may reveal important information, particularly in the detection of toxic factors.

Questions about previous treatment may protect the physician from prescribing a course of action which has already proved inadequate.

The physician also wants to know why the patient came to him at this particular time. Have his symptoms changed in character or increased in severity? Has he been disappointed in the results of previous treatment? Has he read

an article in the paper which seemed applicable to his case and which frightened him?

After the patient has completed his story, the physician systematically reviews the various organ systems in an effort to pick up information the patient may have overlooked. With each system he should not neglect symptoms of possible emotional origin, such as palpitation, indigestion, headaches, tremors, faintness, and dizziness. In the more definite field of the emotions, he pays particular attention to fatigue; sleep disturbances and dreams; worries, fears, and tension; loneliness, depression, shyness, sensitivity, and indecision; and touchiness, irritability, and impulsiveness.

The physician will find that indirect questions or questions which open up discussion are more effective than questions which can be answered yes or no in evaluating a patient's personality and background. The patient should have some idea why he is being asked about his personality; usually a casual explanatory comment suffices, such as "I'm particularly interested in knowing how an illness like this affects you." The doctor should not, however, disguise the reason for his interest in the patient's personality, family, and background if he suspects an emotional factor in the patient's illness and carries his exploration further. Patients give more useful information if they know why it is wanted.

Patients who need help in initiating a self-description may find it easier to get started if the doctor suggests a comparison, as: "Perhaps it would be simpler just to tell me how you are like and how you differ from your sister, mother, daughter, etc." Questions of this type may lead naturally into a discussion of the patient's background, and the physician may go on to suggest, "Now I would like to hear something about your family." If the patient asks, "What do you want to know?" the physician may be a little more specific. "I'd like to know what your mother and father were like, and your brothers and sisters, and in general what went on in your earlier years" is still general enough to permit the patient to emphasize the elements of greatest importance to him and at the same time to gloss over, at least for the time being, material he does not wish to discuss. The physician can thus see the picture in the patient's perspective and still respect the patient's defenses.

The physician is particularly interested in attitudes of relatives toward the patient, specifically as they may contribute to his concept of himself. To fill in the gaps, he can then extend his exploration by more specific suggestions, such as "I would like to know something about your

experiences at school," and, finally, when necessary, direct questions, such as "When did your father remarry?" or "How old were you when you had rheumatic fever?" He should correlate significant events in the family history with the patient's development and the present illness.

The extent of the history necessary to make a diagnosis or to rule out significant emotional causes will vary from case to case, as well as with the experience of the physician and his familiarity with the patient and his family. The medical student goes through a long and detailed routine in taking each history and performing each examination; eventually he learns when to take short cuts, but when in doubt he can always fall back on a more extensive exploration.

To obtain the most accurate information in the shortest time, the physician should do his best to appear unhurried. He should restrict his own activity to the minimum consistent with keeping the patient's story going and making sure that he understands the patient correctly.

The physician's tact and respect for the patient's feelings may suggest some omissions in the history. For example, a patient may say that she has been married just nine years and at another point give the age of her eldest child as eight and a half. Should the physician attempt to find out if the marriage was forced, or if her arithmetic is faulty? The answer lies in the value of the information to the diagnostic process. If the illness is of short duration, there is ordinarily no need to risk embarrassing the patient at this time; on the other hand, if the illness has lasted nine years, the physician wants to know the emotional milieu in which it originated. Even so, he may find out more from indirect questions such as "Did your symptoms start before or after your marriage?" or "I would like to know some more about your courtship and marriage"; whereas a blunt "Was your marriage forced?" is likely to embarrass the patient if the answer is Yes, and may antagonize her if the answer is No. If, in order to avoid possible criticism, she answers No when Yes is the truth, the doctor has accumulated useless information, and the patient feels uneasy because she has misrepresented the facts and is in an embarrassing position if she wants to backtrack later. The advantages of completing the record by probing through a patient's defenses are usually outweighed by the consequent loss of rapport and the patient's increased resistance to further explorations. This is especially true of questions about sexual activity.

Historical material, in general, particularly when it is highly charged with emotional significance, is most useful when the patient associates

it spontaneously with events in his current experience. A patient who says "You know, doctor, when I walked in that man's office yesterday I had the same feeling I used to have when I knew my father was going to punish me," has already begun to recognize a carry-over of feeling from one situation to the other. An isolated historical account of the earlier incident contributes much less to his understanding of its significance.

The patient's emotions may cause him to break into tears or tirades during the interview. If this makes the physician uncomfortable and he shows his discomfort or changes the subject or terminates the interview, he supports the patient's belief that emotions are dangerous and should be hidden. A comment by the physician which indicates that he recognizes that the material under discussion is significant and upsetting to the patient makes him feel less embarrassed and more willing to continue.

The assessment of a patient's feelings — expressed in mood, activity, thought content, behavior, and appearance — is as important to the diagnostic process as the evaluation of the history. The medical student is taught to investigate systematically each facet of a psychiatric patient's intellectual and emotional functioning. Although valuable as a learning device, this procedure is somewhat impractical for general use by the family physician. Instead, he should be alert throughout the entire diagnostic process for verbal and nonverbal evidences of anxiety, depression, withdrawal, or other disturbances of thought or emotion. Whenever he finds signs of disturbance, he should apply specific examination techniques as they are indicated.

If the patient discloses a conflict with his wife, his boss, or others, the physician should be careful not to take sides. If he sides with or against the patient, he becomes directly involved in the controversy. He angers the patient if he sides against him and, if the patient is frightened of his own anger, may increase his anxiety if he sides with him. The patient needs neutral, friendly help in understanding his conflicting feelings.

In any case of suspected emotional illness, the physical and neurological examinations should be performed with particular care. Psychological reactions due to acute or chronic brain disease, particularly in their early stages, frequently simulate reactions of emotional origin. Brain tumors are often difficult to discover in patients with psychotic reactions; metabolic disturbances such as porphyria may be detected only by specific laboratory procedures, and drug reactions often appear to be extensions of the condition for which the drug is taken. Although the extensive subject

of brain disease is beyond the scope of this book, we must keep in mind that any disease of the brain reduces the individual's adaptive capacity. When the ego is weak and on the brink of collapse, an almost imperceptible reduction in brain efficiency may produce a major emotional regression, with symptoms so dramatic that the evidence of brain damage is overlooked.

During the physical examination the patient will give the physician more information about his emotional reactions. For example, a patient who complains of palpitation may show excessive apprehension, appropriate interest, or disproportionate unconcern when the physician examines his heart. If the doctor encourages him to talk at intervals during the procedure, he may add significant material to his history. Although this takes time, it may shorten the diagnostic process in the long run. Excessive modesty or inappropriate lack of concern for conventional coverings often indicates the patient's attitudes toward sexual subjects; and a patient who flinches at the first touch of the doctor's hand suggests that either consciously or unconsciously he is anticipating hostility.

The patient's particular reaction to such procedures as breast examination or blood-pressure reading may reveal specific anxieties, and he will often respond best to prompt explanation and reassurance. The doctor may not wish to reveal the blood-pressure figures, but he should be ready to explain why he believes it is not in the patient's best interest to know them. Patients are sensitive to the reactions of their physicians. Briefly explaining any deviation from the ordinary routine usually reassures the patient.

The disturbing, unconscious significance to many adolescents of a pelvic examination applies to some older women as well. It is neither possible nor appropriate for the physician to attempt to modify these attitudes at the time of examination, but an explanation of its importance and a sympathetic and gentle approach will at least reduce the patient's distress. Rectal examinations are equally disturbing to some patients and require the same consideration.

The physician should not explain everything he does in every case. Passive dependent personalities usually prefer not to take an active part in their medical care and may want the physician to take complete responsibility. When a patient is denying the significance of his symptoms, the physician's explanations may stir up anxiety or precipitate depression. On the other hand, pseudoindependent personalities, who find dependency an anxious state, appreciate full information. The same type of individualization

according to personality pattern is indicated when the physician discusses treatment.

At the conclusion of the history and physical examination, the patient expects the physician to have formed an opinion on the nature of his condition. The physician may or may not have arrived at a definite or tentative diagnosis by this time, but he should have discovered the patient's attitude toward his illness, and his specific areas of concern. Several possible procedures are now open to him.

1. When he has made a definite diagnosis which he believes will reassure the patient, he should simply state his diagnosis, prognosis, and treatment plan in terms consistent with the patient's understanding. If the illness is of emotional origin, the same rule holds. Advising a patient "Forget your troubles" or "Don't worry" will only demonstrate to him that his doctor does not understand him. If the patient could have forgotten them or put them aside by himself, he would not have come to the doctor. Some patients are sufficiently relieved by the reassurance that organic disease does not exist that they can forget their symptoms and no longer need to worry, but they are responding to the reassurance implicit in the diagnosis and not to the subsequent advice.

2. The patient must accept his illness or disability if he is to participate in rehabilitation, and the physician must spend enough time in explaining and in eliciting and answering questions for the patient to understand what he faces and what is expected of him. The physician may need to penetrate the patient's defenses, particularly the defense of denial, and may precipitate a depressive reaction. This type of depression, however, is usually a prerequisite to rehabilitation, and attempts to prevent it by disguising the real significance of the diagnosis or by letting the patient in on his problem gradually may jeopardize the patient's cooperation in treatment.

In illness which is generally fatal, when treatment in all probability will be at best palliative, there is usually no advantage in forcing the patient to face his prognosis, and in such cases the physician should respect his patient's defenses.

3. When the physician suspects but has not definitely arrived at a diagnosis which will be disturbing to his patient, he usually does not need to frighten him with his suspicions unless they are confirmed by laboratory studies. The patient, however, generally expects that if the doctor had good news, he would say so, and, therefore, interprets the lack of any diagnostic statement to mean that the doctor suspects the worst. If the doctor states frankly that he is at

present unable to make a diagnosis but that he expects the tests he is ordering will help him, the patient feels that his doctor is not avoiding confirmation of his fears, and that a systematic investigation of his problem is under way.

4. When the diagnosis is tentative but reassuring, the physician usually says so, as "I don't believe that you have anything more than a bad cold with some bronchitis, but to make absolutely sure, we'd better get a chest x-ray." The doctor thus lets the patient know he expects the x-ray to be negative; the patient is reassured if it is negative and respects the doctor's thoroughness if it is not.

The same procedure should follow the tentative diagnosis of an emotional disorder. Much of the therapeutic value of the physician's early diagnostic impression is lost if he does not communicate it to his patient.

The problem of diagnosis is complicated when both emotional and organic causes contribute to the picture, and it is very difficult, if not impossible, for the physician to determine exactly what proportion of the symptoms result from each cause. The patient benefits more from a frank approach, as "Considering what you have told me of these attacks, and what I have found on examination, I believe that you do have some gallbladder disease. However, I believe that part of your reaction to these attacks, as well as the symptoms you have had between attacks, is caused by nervous tension. I can understand that such painful attacks would make you nervous, but I think the problem you are having with your child might also have something to do with it. In order to do a thorough job, we should investigate all possibilities, so I am going to order an x-ray and some blood tests to check on the gallbladder, and, in the meanwhile, I'd like you to tell me a little more about your child."

The concurrent investigation of both factors helps the patient to recognize that both play a part. If all of her attention is directed to the gallbladder, she will expect that organic treatment will remove all of her symptoms; if she then has a cholecystectomy and if the symptoms related to her emotional tension persist postoperatively, she is likely to resist any attempt to relate them to tension.

The laboratory, besides helping to rule out organic disease, may make positive contributions to the diagnosis of emotional illness through psychological tests. As a general rule the usefulness of personality tests is in proportion to their complexity; the best require the psychologist's special training. The so-called projective tests must

be administered, scored, and interpreted by a psychologist; the physician can administer written or card-sorting tests such as the Minnesota Multiphasic Personality Inventory, but unless he has had special training or at least an unusual background of reading, he should send the tests to a psychologist for scoring and interpretation.

Another indirect help in diagnosis may come from interviews with the patient's family. These are essential when the patient is extremely depressed or out of contact with reality; they are less important with less incapacitated patients. Since the physician is not passing judgment or arbitrating disputes, he has no immediate need to check on the veracity of the patient's statements, and the patient may interpret his attempt to do so as evidence of distrust. Whenever the doctor does decide to interview relatives, he should discuss the reasons for his decision with his patient. The family physician has a great advantage over the specialist in this phase of the diagnostic process, since he knows the patient's personality, family, and background in advance.

Occasionally the placebo has been used as a diagnostic test. The placebo is a substance without therapeutic value given with the suggestion that it will relieve symptoms. It relieves the symptoms of suggestible people; unfortunately, however, it does so without regard to their cause. Pain of any type responds to suggestion: dentists extract teeth under hypnosis, which is an extreme degree of suggestion, and the labor pains of suggestible mothers may respond to similar procedures. Pain of organic origin, therefore, may be relieved by placebos in some people, while in other less suggestible individuals emotionally produced pain may not respond. Since the response to placebos is often misleading, and since the patient often finds out that he is being deceived, with consequent loss of trust in his physician, they should not be used in the diagnostic process. Placebos are almost equally unsatisfactory as treatment, but they do play an important role in research.

SUMMARY

In this chapter we have emphasized the importance of a positive diagnosis of emotional factors in illness, rather than a diagnosis solely by exclusion of organic disease. We have observed the close relationship between diagnosis and the treatment of emotional illness, and the consequent advisability of considering these factors throughout the history and physical examination of any patient with a diagnostic problem. We also discussed significance to treatment of proper timing in the initial diagnostic statement.

The Industrial Back

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THE GREAT VARIANCE in the current management of back injuries suggests the fact that no single explanation is completely satisfactory. This serves to further confuse an already complex problem, particularly in the eyes of those who are not physicians but whose duties include the management of these injured persons.

The purpose of this article is to simplify the problem by biting off a small piece and translating the story into the language of those who can help.

Thus, we direct our first attention to the industrial safety engineers and safety clinics. We hope to explain what the back really is and how it can be traumatized. In this way, perhaps the incidence of back injuries can be reduced; and if they occur, the severity may be minimized.

By the industrial back, we mean the normal back of those in industry, and emphasis is placed in this discussion on the proper use and protection of the workman's back in industry.

We will discuss mechanics of the lower back and integrate certain safety factors in back work.

To understand the mechanics involved, let us take the example of an ordinary tent to acquaint ourselves with a few lines of force (figure 1). The center pole by its upward push supports the entire structure. Thus, as shown in the illustration, the center pole pushes upward not only to carry the weight of the tent itself, but also to balance the downward pull of the stabilizing guide wires to either side of the tent. In addition, the bucket, rifle, and clothing are also loads which must be supported by the center pole.

Now, let us apply this force to the human back superimposed upon the outline of this tent (figure 2).

The anatomy of the back is portrayed schematically to facilitate simplicity in describing the forces involved. The spine acts as the center pole of the tent. It supports the torso and everything held up by the torso. The spine must also balance the downward pull of the human guide

wires or the paravertebral muscles. Nature, of course, does not employ lengthy guide wires to connect the spine to stakes at some far distance from the center of the body. This function is taken over by the paravertebral muscles close to the spine, which, nevertheless, perform the same function and obey the same mechanical laws. In the illustration, therefore, the spine supports the torso, head, arms, and everything carried therefrom — bucket, rifle, and clothing.

The additional difference is that whereas the tent pole is static, the spine is kinetic. The muscle-tendon supports of the spine also produce

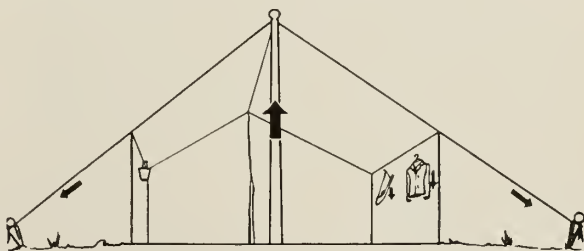


Fig. 1. Center pole supporting not only entire weight of tent, but also bucket, rifle, and clothing.

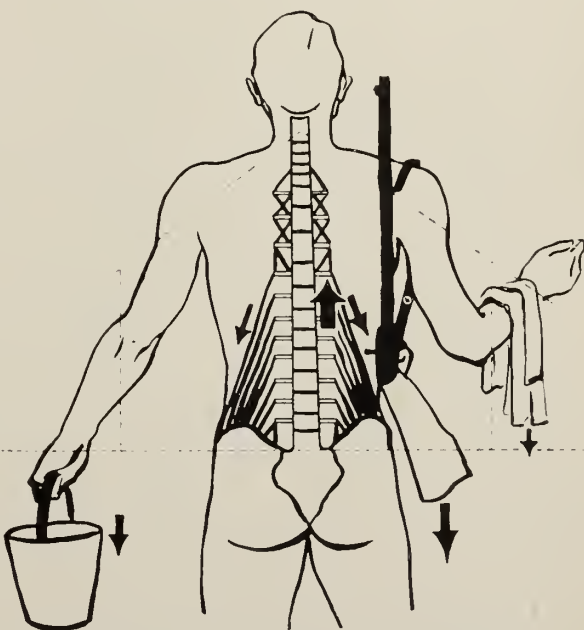


Fig. 2. Anatomy of back schematically portrayed with the spine acting as center pole of the tent.

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motion and are called upon for the most part to support the body in asymmetrical positions of less ideal mechanics than those schematically portrayed in this illustration.

Since we now can visualize the back as a mechanical structure, some factors become evident. Most important of these is the realization that the strongest back has a *maximum* load or work potential. Our aim is not to place a limit upon back work, but to reduce the hazards of back work by calling attention to the following factors which can reduce the strain if practiced by the man or woman at work.

The first factor deals with the forces of leverage. Every workman knows that he can move a heavy object more easily with a crowbar. Actually, the crowbar is a lever. This mechanical principle of leverage may be used to advantage in our own bodies by the proper positioning of our arms as crowbars.

To better illustrate this principle, let us examine the illustrations in figure 3. In the illustration, just 10 lb. of force, portrayed by a small baby on a see-saw, can be used to lift a much heavier weight, portrayed by a piano on the other end, provided the difference is great enough

between the distance from the baby to the fulcrum as compared with the distance of the piano to the fulcrum. Thus, the baby weighing 10 lb. placed 10 ft. from the fulcrum (distance XY) is equivalent in force to the piano weighing 100 lb., placed only 1 ft. from the fulcrum (YZ). Applying this leverage principle to the back, we can see how a person lifting the 10 lb. baby with arms outstretched employs a disadvantage of leverage and may exert thereby a force which would require a 100 lb. force of muscle to balance or stabilize his action.

For the same reason, we can see that a workman who carries a load close to his body may lift or carry 100 lb. of weight which would demand only a 100 lb. of muscle pull to balance or stabilize the larger load.

Thus, it is obvious that the 10 lb. baby in the first instance demanded the same muscle strength as the 100 lb. load in the second instance. Therefore, the first dictate of mechanics in the use of the back is *always carry a load close to the body*, which acts as an axis of support.

Many of the more primitive people have learned this lesson through the generations. The oriental water carrier balances his load from both ends of a rigid yoke and, thus, is able to apply the force directly upon his shoulders or right over the central axis of the body.

Balinese women are noted for the large and heavy loads which they are able to carry on their heads. Again, this is made possible by reason of the fact that it is poised directly over the central axis of the body.

The second factor deals with momentum (figure 4). It is a fact that a relatively light weight in motion is equivalent to a much heavier weight not in motion because of the factor of momentum. If a 10 lb. package merely drops a distance

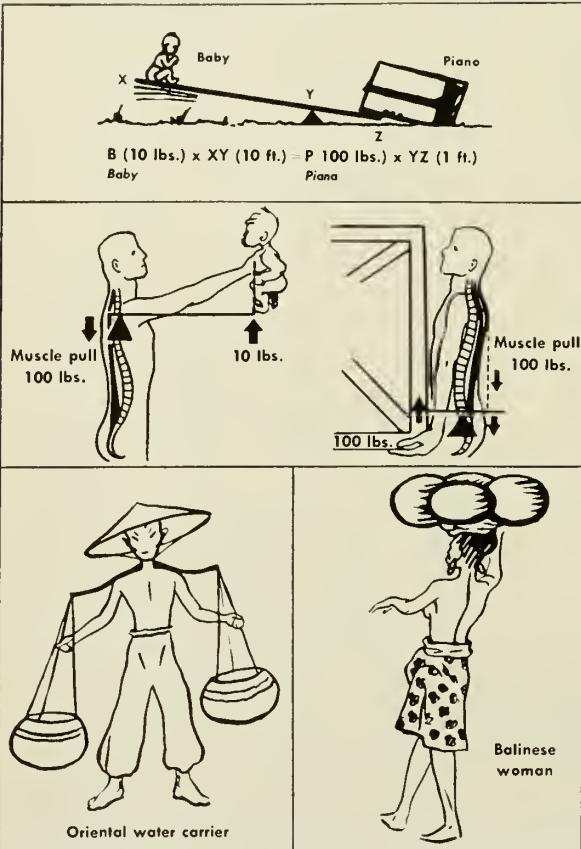


Fig. 3. The principle of leverage portraying the fact that a load should always be carried close to the body.

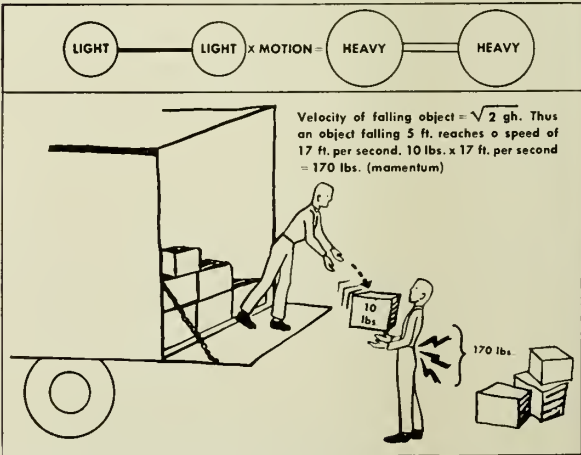


Fig. 4. The factor of momentum illustrating why a heavy load should never be caught or thrown.

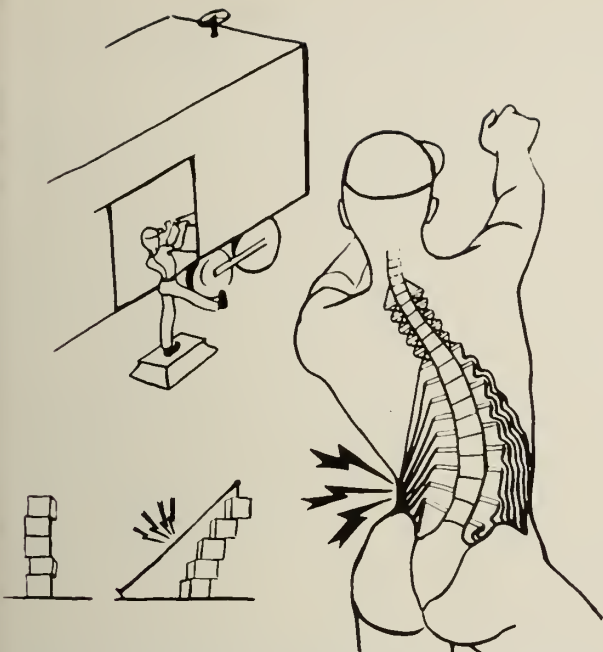


Fig. 5. The importance of positioning depicted by a workman twisting to the left so that his weight is not evenly distributed, thus demonstrating the need of securing a good footing before lifting a load.

of 5 ft., then the speed at which it will be falling at the end of 5 ft. will be 17 ft. per second. Thus, the force exerted at that particular level is 10 times 17 or 170 lb. momentum, and this tremendous increase in force must be met by the recoil of whatever obstacle it meets. A pair of arms outstretched ready to catch and the back which supports these arms must accept this force, and, thereby, the vulnerability is increased tremendously. Therefore, *never throw nor catch a heavy load.*

The third factor deals with positioning (figure 5). If a number of blocks were stacked directly over each other, they could be expected to remain balanced without additional help. On the other hand, if these blocks were stacked off balance, they could only remain in the upright position if some additional force such as a guide wire were exerting itself in their behalf. If a workman, therefore, positions his back by twisting or leaning to one side, he sets up the same mechanical disadvantage in the musculature which supports his vertebral column.

In the illustration, we see an example of such a possibility. This particular workman is using the paravertebral musculature of his left side to pull his entire thorax to the left, thereby carrying the weight of the thorax. In addition, these same muscles are supporting the weight of his right lower extremity indirectly, since it is suspended in air, and its entire weight is now de-

pendent upon the torso. Obviously, the work in this case is relegated to one small myofascial group instead of being evenly distributed.

The additional force of pulling or lifting an object while in this position may be the "straw which breaks the camel's back." Therefore, *always secure a good footing with both legs upon the most level ground.*

These are some of the mechanical factors which, when observed, should enhance a workman's use of his back. They should be taught over and over, particularly to the new workmen, by shop talks, posters, and any other practical methods which keep the facts before them.

It is no matter of chance that the *new* workman suffers the greatest incidence of back injury. This is so in spite of the fact that he is usually younger and stronger than the workman who has been on the job for a longer period of time. The older workman is protected by his experience in the "know how" of lifting.

The most common industrial injury to the back is not the popular rupture of the intervertebral disk. It is a simple myofascial sprain in the great majority of cases.

I have two pleas concerning the handling of these sprains. A common practice in some clinics is for the doctor or nurse in attendance to order diathermy or some other form of heat as a first-aid measure after a low-back infraction. This procedure is welcomed by the patient because of the relaxing effect of heat upon the protecting muscle spasm.

The fact is, however, that whenever a sprain of the back occurs, "inflammatory changes" set in just as in any other trauma. The stretched or torn fibers start this reaction and the vessels dilate allowing serum and even blood to infiltrate the area. The resultant local swelling presses upon nerve fibrils and results, in turn, in a protective splinting by spasm of the surrounding musculature. All of this produces pain which aggravates the condition in excess of the severity of the initial injury. A vicious cycle is thus begun.

We see patients who have suffered a relatively minor "pulling of the back," who have continued their activity and finished the day's work. The next day, however, when the complicating changes of inflammation have taken over, the patient can scarcely roll out of bed to go to work.

If heat has been applied, the amount of serum and blood pouring out has been increased, and the patient's condition is far worse than the good which he gained from the temporarily relaxed muscles. Heat and physiotherapy have no place in the emergency care of the sprained back.

My second plea concerns the use of corsets and braces. A popular opinion seems to be that if a brace is prescribed, the patient acquires a false proof of his injury and is frightened into perpetuating his disability. This is a situation that we sometimes refer to as "compensationitis." Such a condition needs to be corrected by education. Fear of a patient's reaction is not a valid reason to deny the injured back the benefits of supports which not only make the patient more comfortable but are instrumental in effecting a more rapid cure. Actually, braces frequently enable the workman with the injured back to return to duties while wearing the support.

One set of rules for the treatment of all acute low-back sprains is as impractical as would be one style of clothes to fit all men. Perhaps a useful guide may be found in the following dictates:

1. For the first twenty-four hour period after a low-back sprain occurs, apply an ice bag to the site of pain. This should be used for a fifteen-minute period every hour.

2. Insist upon complete rest on a nonsagging bed, with a board between the spring and mattress, until the pain and muscle spasm disappear.

3. In the event that the relief of pain and muscle spasm requires more than ten days, provide a fitted support in the form of a plaster

body jacket, brace, or rigid corset according to the severity of the distress and heaviness of the patient.

4. Appraise the patient's tolerance in his support and see that he returns to work as quickly as possible even if less arduous duties must be arranged than were required in his pretraumatic assignment.

5. Continue the use of the support for twice the period of time required for the complete relief of the acute distress.

SUMMARY

The workman's back is likened to a mechanical apparatus. A mechanical advantage can be created in its use by: (a) carrying heavy loads close to the body rather than upon outstretched arms; (b) never throwing or catching heavy objects; and (c) securing a good footing with both legs before lifting a load.

The majority of back injuries are simple low-back sprains and a pattern of therapy for this condition is outlined embodying the principles of cold, rest, and supports. Such simple management in the early care of the back prevents considerable distress and loss of time.

I wish to express appreciation to Dr. Philip London for the art work in the foregoing illustrations.

CONTROLLED RESPIRATION is the safest anesthetic procedure during surgery for scoliosis, according to M. V. H. Denton, F.F.A.R.C.S., and D. M. O'Donoghue, F.F.A.R.C.S., Royal National Orthopaedic Hospital, London.

Because paralytic scoliosis may reduce the vital capacity, preoperative breathing exercises are begun when the Risser jacket is applied to correct scoliosis. Nembutal and atropine are given for young patients and omnopon and scopolamine for adults.

At the time of surgery, intravenous thiopentone (Thiopental) and gallamine triethiodide are used to induce anesthesia. Endotracheal intubation with a cuffed tube or with a throat pack and a plain tube is performed. The patient is placed in the prone position, and intravenous infusion is begun. Controlled respiration is employed, and nitrous oxide-oxygen with intermittent thiopentone and gallamine is used to maintain anesthesia. With controlled respiration, carbon-dioxide tension is altered little and the effort of respiration is eliminated.

After operation, gross intercostal paralysis may require oxygen administration by mask for three or four hours, or severe respiratory complications may necessitate use of an artificial respirator.

M. V. H. DENTON, and D. M. O'DONOGHUE: *Anaesthesia* 10:366-368, 1955.

Infant Feeding at the Midcentury

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FIRST, may I express my pleasure at being invited to participate in the program honoring Dr. McQuarrie. Much of the advancement in scientific medicine has been made in his professional lifetime, and, one might add, Dr. McQuarrie himself has been one of the main contributors who have made these accomplishments possible.

It seems appropriate on this occasion, therefore, to speak upon a subject that has made most of its scientific progress during Dr. McQuarrie's medical career. In the time at my disposal, I should like to talk about infant feeding shortly after the middle of this century. At the beginning of the century, infant feeding was in a chaotic state, indeed. Mortality and morbidity rates were high among the artificially fed. The greatly increased chances for survival of the breast-fed infant were clearly recognized, and every effort was made to promote breast feeding. Wetnursing was almost a profession in those days. In the short space of fifty years, we find the situation almost completely reversed. Breast feeding is distinctly on the wane, wetnursing has become extinct, and artificial feeding has become so simple and safe that even the services of a physician are no longer necessary to insure success.

What has happened in these fifty years that has led us to regard so lightly the food that nature designed for infant consumption, and what has happened in the amazing progress of artificial feeding that has permitted it to push breast feeding increasingly into the background? First let us look at the situation as it applies to breast feeding.

BREAST FEEDING

Although no statistical studies are available to prove the point, there would seem to be little doubt that the incidence of breast feeding in the United States is progressively declining. The reason seems clear enough. Artificial feeding has become so simple, safe, and successful, that breast feeding no longer seems worth the bother. As of today, it would appear that, with the exception of a few centers with an interested personnel, breast feeding is largely restricted to

what might be termed "natural nursers" — those women who are so physiologically and psychologically constituted for nursing that they attain success whether or not they receive professional advice and assistance. The many others who start out so hopefully abandon the task after a few days or weeks, usually because some minor difficulty is encountered which could have been anticipated and prevented.

It would appear that the declining incidence of breast feeding among American women is not the result of lack of willingness. In my own experience, most primiparas — perhaps 4 of 5 — express a desire to breast feed, only to be defeated in the first few days or weeks under the system of neonatal care which prevails in a majority of hospitals today. Prominent among these factors is the lack of a hospital personnel really interested in promoting breast feeding. Here the medical profession must share the blame with the nursing profession. Discussion with the obstetrician about what parturition preparations for nursing the pregnant mother should undertake apparently occurs only rarely. It is a safe venture, also, that few nursing staffs have one or more nurses especially skilled in the art of breast feeding who are available for advice and assistance in the immediate postpartum period when such services are particularly important. Manual expression of the breasts was advocated by Sedgewick¹ in this very city some thirty years ago as an effective means of stimulating the flow of milk. Yet, probably not more than a handful of newborn nurseries in the entire nation have a nurse skilled in this technic who can teach it to mothers. In the nurseries with which I am familiar, the time of even graduate nurses is largely consumed carrying babies to and fro between the nursery and mothers' rooms. Presumably, this is the general situation made necessary by the shortage of nurses, but it would seem that such unskilled services could be advantageously relegated to other persons, making available some of the time of the trained nurse for parent education.

Still another factor that adversely influences the incidence of breast feeding is the current custom of discharging mothers from the hospital

on the fifth postpartum day. Rarely have the problems of breast feeding been resolved by this time, with the result that further solution becomes the responsibility of the mother at home. Resumption of household duties plus concern over the infant's welfare are not conducive to milk secretion. The easiest solution to the hunger wails of the baby is to reach for the bottle, often upon the advice of the physician. It is almost axiomatic that when bottle feedings begin breast feedings end. Were it possible to keep mother and baby in the hospital for ten to fourteen days until lactation becomes securely accomplished, as was once the custom, it seems reasonable to suppose that breast feeding would not be at the low ebb at which we find it today. But with the high incidence of hospital deliveries and the present cost of hospitalization, it is undoubtedly out of the question to expect to keep American mothers who wish to nurse their babies in the hospital for any such length of time. At least, however, one of the major causes for the defeat of breast feeding ought to be recognized.

The technics for securing lactation on a sound basis, and by this is meant mothers who can nurse their babies for four to six months, have been reviewed many times. Among the first to point out what could be done was Sedgewick, who, in a special study, succeeded in securing lactation for some 80 to 90 per cent of mothers. Waller² in England and Edith Jackson³ and associates at the Yale Rooming-In Project in New Haven have described these technics in more recent times. Waller states that, in his hospital, preparations for nursing are begun in the latter months of pregnancy. Manual expression is taught, and all primiparas express colostrum from their breasts during the last two months. Special breast shields are worn to correct retracted nipples. Postpartum, every precaution possible is taken to prevent sore nipples. Painful engorgement receives careful attention, with hormonal treatment if necessary. Stasis in the ducts and alveoli is avoided by manual expression of the breasts during the "coming-in" and establishment phases of lactation. Every effort is made to avoid concern and worry on the part of the mother. Assistance and advice are readily available from both the medical and nursing staffs. Let us remember that measures as simple as these have made it possible for 77 per cent of primiparas in Waller's hospital to nurse their babies for six months. There is nothing complicated or difficult about these requirements. Mainly, people are needed who are interested in helping mothers who want to breast feed.

Many, we suppose, will say that the best solution to the problem under discussion is "rooming-in." While this is undoubtedly true, rooming-in for the rank and file of the obstetric hospitals of the country is a long way off. In the meantime, it seems clear that the present downward trend in breast feeding could be reversed if there was any great interest on the part of the medical and nursing profession to do so. In the last half century, artificial feeding has received a tremendous amount of attention while breast feeding has received relatively little. Most of the articles on breast feeding which have appeared in the literature have been concerned with extolling the virtues of human milk over cow's milk for infant consumption — an approach which obviously has not been effective in influencing the incidence of breast feeding. In recent years, an occasional article has been written which denies any superiority of human milk, whose only advantages are regarded by some as being psychologic. But there has been relatively little publicity about the causes of failure of lactation or about the technics necessary to secure successful breast feeding.

In concluding this portion of my remarks, I should like to suggest that one more effort be made to revive interest in breast feeding before we accept the *status quo* as final. The approach that might be attempted, it seems to me, would be of an educational nature on a national scale. What I have in mind is a program similar to that conducted by the Committee on the Fetus and Newborn of the American Academy of Pediatrics. This group has prepared a manual on standards for nurseries in the care of newborns and prematures which has been widely circulated among the obstetric departments of hospitals throughout the United States. Perhaps the Academy or some other organization could be persuaded to set up a committee on breast feeding which would prepare a manual on the technics of breast feeding which could be given equally wide distribution. A manual which spelled out in detail the causes of failure of lactation and the technics necessary for successful breast feeding, readily available to house and nursing staffs, might, I would hope, result in the establishment of more interested personnel in the problems of breast feeding.

ARTIFICIAL FEEDING

Now, I should like to turn to artificial feeding. Most of us would agree, I think, that the scientific accomplishments in this field must be ranked well up with any of the other remarkable medical achievements of the past fifty years. It

would be impossible to estimate the number of lives that have been saved and the amount of illness among infants that has been averted as a result of the knowledge gained about artificial feeding, but some idea can be had by recalling that the infant mortality rate in 1900 was around 150, whereas today it is well under 30.

It may be of interest to review briefly the historic accomplishments which have contributed most to the present highly successful state attained in artificial feeding. I should like to follow this with a few remarks about 1 or 2 problems which still face physicians in their infant feeding responsibilities.

It is generally accepted that Biedert in Germany in the 1890's pioneered the scientific age of modern artificial feeding by investigating the chemical composition of milk. Later, Finkelstein advanced the theory that carbohydrate fermentation in the intestine was the chief cause of diarrhea. He devised Eiweissmilch or protein milk, still in use today, to counteract its harmful effects. Czerney held that fat was largely responsible for infant diarrhea and recommended formulas low in fat with added carbohydrate, a common practice in modern times. Some of you may remember Czerney-Kleinschmidt's butter-flour mixture, which was designed for infants intolerant of fat and was used in this country until two or three decades ago. In America, Rotch was the chief exponent of percentage feeding, a method of formula preparation which was continued well into the 1920's. Here, complexity in artificial feeding reached its climax. Formulas were constructed according to percentage of fat, carbohydrate, and protein. At times, even the protein was split to alter the proportions of whey and casein. Stools were examined frequently with suitable stains for evidence of excessive fat. Depending upon the findings, the percentage of fat in the formula would be increased by a fourth to a half of 1 per cent. Fractional increases or decreases in the carbohydrate or protein content were similarly made. In retrospect, such minutiae seem amusing, and yet Rotch's teaching undoubtedly materially advanced the cause of artificial feeding.

In the meantime, the science of bacteriology was coming to the fore and should, perhaps, be credited more than any other single development with placing infant feeding on a sound basis. So long as infants were fed formulas contaminated with pathogenic bacteria, little hope of success could be entertained. Pasteurization, production of certified milk, boiling or heat treatment by other means, refrigeration, improved sanitary control of milk production and

marketing, and public health control of water supplies and sewage disposal all contributed to the goal of a food supply bacterially safe for infant consumption. As these measures became effective, infant mortality and morbidity declined sharply. Today, an outbreak of diarrhea due to a contaminated milk supply excites national comment.

A second advance of equal or nearly equal importance was the knowledge gained about vitamins. It began with Eijkman's discovery in 1897 that the feeding of rice polishings could reverse the symptoms brought about by the feeding of polished rice, later shown to be B₁ or thiamine. One after another of these essential substances has been isolated and its role in human nutrition assessed. The vitamin content of a host of foods has been determined, and scientific bodies, such as the Food and Nutrition Board of the National Research Council and the Food and Drug Administration of the Federal Security Agency, have established dietary allowances for human nutritional needs. In spite of the ready availability of this specific information, vitamin administration in some instances has gone from "too little" to "too much." Today, we are in the somewhat anomalous position of seeing such deficiency diseases as rickets and scurvy disappearing from the American scene only to be replaced by toxicity diseases from excessive vitamin administration, examples of which are vitamin A and D intoxication. The amazing recent discovery that the deficiency of a few micrograms of pyridoxine, B₆, in the young infant's diet results in convulsions clearly indicates that much still remains to be learned in this field of nutrition.

More recent advances in the long and chaotic evolutionary course of artificial feeding were the substantial contributions made by Marriott and by Brennemann. Marriott advanced an explanation for the difference in the digestibility of human milk and cow's milk based upon the degree of acidity of the stomach contents following ingestion of either. For human milk, Marriott found the average pH to be 3.6. This degree of acidity inhibited bacterial growth, permitted gastric digestion, favored gastric motility, and, upon passage of the stomach contents through the pylorus, stimulated production of secretin which in turn stimulated the flow of bile and pancreatic juice. On the other hand, when equivalent amounts of undiluted sweet cow's milk were fed, the acidity of the gastric contents averaged a pH of 5.3. This degree of acidity, Marriott maintained, did not inhibit bacterial growth, was not sufficient for peptic digestion, and was below the optimum for secretin formation. The difference in the be-

havior of the milks is due to the higher buffer content of cow's milk, which is 3 times that of breast milk. Addition of sufficient acid to neutralize the buffer substances of cow's milk brings it closer to breast milk in ease of digestibility. In fact, Marriott advocated feeding whole acidified cow's milk to infants in self-demand quantities in the same manner as breast-fed babies are permitted to take their fill from the breast. He recognized that acidifying cow's milk precipitated a fine casein curd and that the physical state of the curd was an important factor in the digestibility of milk mixtures, but he considered gastric acidity of paramount importance.

Brennemann, on the other hand, contended that the physical state of the casein curd was the important factor and that the value of acids was due solely to the way in which acids modified the curd. This appears to be the prevailing view today. Human milk yields fine, soft, flocculent curds in the stomach, a physical state which permits full utilization with minimal intestinal losses. Cow's milk produces large, tough curds which Brennemann characterized as being peculiarly solid. Partially digested, they may appear in the stools as protein curds, usually accompanied by fat curds, and thus may account for significant loss of nutrient material. As the importance of Brennemann's observations on the physical state of the curd became fully appreciated, it has become routine to process the infant's formula by some method effective in reducing curd tension. Methods in commonest use at present are dilution, boiling, evaporation, drying, and acidification. It should be noted that pasteurization has little or no effect upon curd tension.

Finally, in this brief historic résumé, mention should be made of the extensive chemical and vitamin analyses of various milks which have been made by Macy and associates and by others. Of particular value has been the determination of amino acids. Previous to availability of this knowledge, it had been generally held that the protein of cow's milk was inferior to that of breast milk in that some of the essential amino acids in the casein portion were lacking. This concept was based upon the observation that animals with fur and hair require more cystine than is present in casein. But, as Jeans has pointed out, human beings do not have this requirement. Both adults and babies have been kept in nitrogen balance when fed equivalent amounts of lactalbumin and casein. Thus, the concept once held that the lactalbumin of breast milk was a superior protein nutritionally to the casein of cow's milk is no longer tenable.

The practical application of the controversy over the relative nutritional merits of lactalbumin and casein involves the amount of protein which the artificially-fed infant should receive compared to the breast-fed infant. Until recent times, amounts considered appropriate have been 2 to 2.5 gm. per kilogram daily for the breast-fed infant and 3 to 3.5 gm. per kilogram daily for the infant fed cow's milk. This clearly implies that the protein of cow's milk is inferior or less well utilized in some manner than the protein of breast milk.

Some years ago, Jeans⁴ conducted an experiment in which the protein and calcium intake of the artificially-fed baby were adjusted so that nitrogen and calcium retentions were of the same order as those of the baby fed human milk. He reported that tissue turgor and motor development were poorer and that the rate of linear growth was less than occurs when the larger amounts of protein and calcium of the usual cow's milk formula were fed. The breast-fed baby, on the other hand, has good tissue turgor and motor development and shows excellent linear growth on the same nitrogen and calcium retentions that result in the poorer growth of the artificially-fed baby. He interpreted this to mean that requirement standards for the artificially-fed baby should probably not be based on the requirements of the baby fed human milk.

So long as the view prevailed that the casein of cow's milk was a poorer protein than the lactalbumin of human milk, a ready explanation was at hand for such observations as those made by Jeans in his experiment. But difficulty was encountered with this view when it was shown by chemical analysis that the amino acid content of casein was not deficient when compared to the amino acid content of lactalbumin. Jeans⁵ stated in his presidential address before the American Pediatric Society in 1950: "The basis of the conceded superiority of human milk seems still to be something of a nutritional mystery." There is, however, an additional factor which needs consideration in attempting to assay the comparative nutritional merits of the 2 milk proteins. This is the physical state of the curd, the importance of which was emphasized by Brennemann. Lactalbumin does not coagulate in the stomach, while casein does. Providing the curd of cow's milk is rendered readily digestible by a single or a combination of methods which reduce curd tension comparable to that of human milk, it would appear that the protein requirement of the artificially-fed infant should not differ greatly from that of the breast-fed infant.

These are some of the high lights which have

brought us to our modern concepts of artificial feeding. They include bacteriologic control of the infant food supply, adequate vitamin administration, processing of the milk by one or more methods to reduce curd tension to minimum levels, and detailed chemical analyses of milk with special reference to the amino acid content of the protein fraction. It may be said that, as a result of empiricism, research and fifty years, artificial feeding of infants has been brought to a safe, simple, successful, and nearly uniform procedure. As Brennemann so aptly stated: "Today we have emerged from a chaos of complexity to a chaos of simplicity." We no longer evolve formulas with the help of algebraic equations; we are actually confronted in a given case by the question of which simple method of feeding to select from among a wide variety, any one of which will in all probability be quite satisfactory. Meyer,⁶ in his recent book on infant feeding, states that there are 9 available types of fresh milk, over 460 brands of evaporated milk, 24 companies manufacturing 58 different milk foods, and 27 separate carbohydrate modifiers.

But not all the problems of artificial feeding have been solved. There is, for instance, a general tendency to feed young infants more and more concentrated formulas and to begin solid food additions at a surprisingly early age. Only in the last few years has realization emerged that factors other than those concerned purely with nutrition must be taken into account in formula construction. There are 2 examples that may be cited to illustrate this point. First is feeding in the neonatal period. Formerly it was held that the initial formula need never be weaker than half milk and half water. This is undoubtedly true in so far as the infant's digestive ability is concerned, but it fails to take into account the baby's ability to handle the calcium and phosphorus content of such a mixture. Cow's milk has 3 times more calcium than does human milk and 6 times more phosphorus. The ratio of Ca:P for cow's milk is 1.3:1 and for human milk, 2.3:1. Cow's milk then not only has a disproportionately high phosphorus content compared to human milk but also has a larger amount of phosphorus relative to calcium content.

In recent years, studies have been conducted by several different observers on the serum phosphorus and serum calcium levels during the neonatal period in infants fed human milk and those fed customary cow's milk formulas. In the former, calcium and phosphorus determinations invariably are found to be at or near normal

values, but, in infants fed cow's milk, hyperphosphatemia and hypocalcemia are frequent findings. Gardner and associates⁷ have pointed out the potential danger to the infant in the neonatal period from feeding concentrated cow's milk mixtures. Formulas, even diluted 2:1 with water, lead to increased serum phosphorus and decreased serum calcium and hence are unphysiologic in the neonatal period and tend to result in tetany of the newborn. The suggested explanation for these observations is renal immaturity and temporary hypoparathyroidism. The authors' recommendation for the artificially-fed infant in the neonatal period is a formula made of 1 part cow's milk, 2 parts water, 10 per cent carbohydrate, and added calcium gluconate to produce a Ca:P ratio approaching that of human milk. While it is unlikely that many nurseries could be persuaded to add calcium gluconate in the formula laboratory, it does seem reasonable that there should be a more general awareness on the part of those responsible for formula construction for newborn infants of the potential dangers of the relatively concentrated formulas now so generally prescribed. This is all the more important when one considers the established fact that elevated phosphorus and depressed calcium levels usually associated with neonatal tetany may be present without manifest symptoms of tetany.

A second common tendency in modern infant feeding which may need revision is that of prescribing concentrated formulas for young infants past the newborn period. For instance, it was demonstrated by McCulloch⁸ that infants can be successfully nourished without carbohydrate additions to the formula. In his study, he employed evaporated milk diluted to a point isocaloric with whole cow's milk. More recent studies have shown, however, that the feeding of such mixtures under certain circumstances may not be entirely free of danger. Pratt and Snyderman⁹ fed 6 rapidly growing small infants a food mixture of evaporated milk and water only and compared the renal solute load imposed by this feeding with that of an isocaloric feeding of evaporated milk and water with added carbohydrate. The same infants were used in the study. The renal solute load with the unmodified milk mixture was 85 per cent greater than for the mixture with added carbohydrate. The authors pointed out that obligatory water required for the renal excretion of this extra load, while adequate under normal conditions, might well become rather quickly depleted under uncompensated water loss from profuse sweating, vomiting, diarrhea, or impairment of

urinary concentration. It is interesting to note that the renal solute load from human milk would be only one-third that of the evaporated milk mixture with carbohydrate added. Clearly, the water reserve of the breast-fed infant is at a safer level than that of the artificially-fed infant. Here again, evidence is advanced that factors other than those of a purely nutritional nature merit consideration in formula construction.

Such studies as that of Pratt and Snyderman suggest that not only is it desirable that formulas contain added carbohydrate, at least up to the level of human milk, but that their composition be such that body water reserves be conserved to as great an extent as possible. These criteria are safely met by formulas constructed for infants past the neonatal period which are isocaloric with human milk, 20 calories to the ounce, and have a caloric distribution which provides for 15 per cent of the calories from protein, 35 per cent from fat, and 50 per cent from carbohydrate. Thus a formula of 11 oz. of evaporated milk, 22 oz. of water, and 1.5 oz. of carbohydrate supplies 20 calories to the ounce and has the desired caloric distribution among protein, fat, and carbohydrate. Moreover, water reserves beyond that required for excretion of the renal solute load are adequately provided for.

There is another tendency in modern infant feeding which needs to be brought under critical scrutiny. This is the practice of beginning solid food supplements at increasingly early ages. Early in the 1920's, solid food additions were made rather cautiously during the latter months of the first year. Marriott, in the second edition of his excellent book on infant nutrition published in 1935, states that the appropriate age to begin solid food additions is six months. Today, many infants are having their milk diets supplemented by solid foods as early as the second and third week of life and many more, perhaps a majority, by the beginning or middle of the second month. It is difficult to justify this practice on purely nutritional grounds. The infant's first nutritional need beyond that supplied by an adequate formula and vitamins is for iron and perhaps for some of the vitamins of the B complex, especially thiamine. Iron stores are sufficient for the first three or four months of life. Even these nutritional requirements could be met by medicinal administration.

Some maintain that the early feeding of solid food is of psychologic advantage in that the baby can be accustomed to a wide variety of foods at an early age. It seems more likely that

the practice is merely the result of competitive empiricism among both physicians and parents, a trend which began many years ago. It can be expected that the pendulum will shift back a little as more exact data are accumulated concerning the optimum time for introduction of solid food into the infant's diet. Considering the infant's nutritional requirements, three months of age would seem to be a reasonable time for routinely beginning solid foods. Exceptions can be made for rapidly growing, hungry infants who are not satisfied with full bottles of the milk feeding.

PROBLEM OF INFANT COLIC

This concludes a discussion of the points about some of the practices in modern infant feeding which, it seems to me, require further evaluation. In closing, I should like to mention one more topic which has remained essentially unchanged and unsolved throughout the fifty-year history of infant feeding. This is infant "colic."

Colic is a difficult topic to discuss because no clearly defined clinical entity is indicated by the term. The propensity for infants to cry in the early months of life has become associated in the minds of the laity, and in some professional minds as well, with the expression "three-months' colic." Thus, crying and colic tend to be used more or less synonymously. A variety of etiologic possibilities have been suggested by different observers as playing the major role in colic. Among these are hunger, swallowed air, allergy, excessive fat in the milk, too small a hole in the nipple in bottle-fed infants, enterospasm, imbalance of the autonomic nervous system, lack of parenteral affection, and a host of others. Brennemann's opinion was that colic is due to an excessive accumulation of gas in the intestines fostered by the highly fermentable content of breast milk, and, as a result, the overdistended intestines become kinked and acutely obstructed at the bends. Effort to overcome this obstruction, he stated, leads to colic on exactly the same basis as that of other acute types of colic such as the gas pains after abdominal operations and in peritonitis; the sharp, intermittent pains of intestinal obstruction and of labor; and the excruciating pains of gallstones and renal colic. It seems doubtful that this empiric view would find many supporters today.

Crying in infancy was one of the first problems investigated by Aldrich when he went to the Mayo Clinic as Director of the Community Child Health Research Project. In the newborn nursery, 50 babies were observed day and night for eight days. Observations were kept on the

total number of crying episodes, the duration of each crying period, and the time of day when the crying occurred. As nearly as possible, the cause of each crying episode was recorded. There was an average of 11 crying episodes per baby per twenty-four hours. The longest period was four hours and the shortest three-fourths of an hour, with an average of two hours per baby per day. The peaks of crying came at 6:00 P.M. and at 12:00 midnight when a minimum of nursing service was available. In a subsequent study, Aldrich reported that increasing the personnel at these periods reduced the crying by 50 per cent. Of the babies, 35 per cent cried because they were hungry, 10 per cent because of soiled diapers, and 20 per cent because of wet diapers. This left 35 per cent for which no apparent cause for crying could be ascribed. Aldrich speculated that the changed environment from intrauterine existence played a part. Possible environmental factors would be light, lack of warmth, noise, clothing, and the lack of the rhythmic rocking motion to which the infant had become accustomed in his mother's uterus. In a similar study in homes, using the mothers as observers, only 4 daily episodes of crying occurred as compared to 11 in the hospital. An inference to be drawn from these studies is that crying is directly related to the amount of attention received by the baby.

"Gas on the stomach" and "full of gas" are common complaints voiced by parents about the period of infancy under discussion. That the source of the gas is largely swallowed air may be demonstrated by a simple procedure. A roentgenogram of a baby twenty or thirty minutes after birth will show the stomach to be distended with air. Two hours later, air will have progressed through most of the small intestine, and, within six to seven hours, it will have reached the rectum. Thus, attempts to rid the baby of gas would appear to be futile, since obviously there is no such thing as a "gasless" baby.

Whatever the cause of crying or "three-months' colic," it is an extremely disturbing factor to parents, particularly those with their first-born child. Parents should be warned when they leave the hospital that a certain amount of crying is to be expected. A great many babies, perhaps most, have a wakeful, fussy period sometime during the day. Practically always this occurs in the late afternoon or evening and lasts for two to four hours. At its conclusion, the baby goes to sleep and rests peacefully the remainder of the night. It is inconceivable that the baby could be ill for these few hours or even suffer indiges-

tion or colic and be well for the remainder of the twenty-four hours. Because these crying episodes come late in the day and seldom in the morning, it seems likely that fatigue may, in part at least, be responsible. One gains the impression that the stimulus which provokes crying in a young infant, whatever its nature, need not be very great.

This leads to a conception of crying in infants, advanced by Aldrich, which is plausible and which parents can readily grasp. According to this concept, crying during the first few months of life is a protective reflex designed by nature as an effective means of calling attention to his needs at a time when he lacks other means of making wants known. It must be looked upon as a wise provision on the part of nature, for without it one may question whether the human race could have survived. Moreover, the crying reflex gradually disappears as the infant matures and the need for this protective mechanism subsides. Crying in the young infant, then, may be thought of as expected characteristic behavior for this period just as there are other characteristic patterns of behavior in other periods of childhood. Stimuli which call forth the cry may be minor and inconsequential or may be of major significance, such as hunger or actual discomfort.

Customary treatment for babies assumed to have colic includes phenobarbital, atropine, enemas, suppositories, hot-water bottles to the abdomen, and carminatives. While any of these measures may result in relief for the time being, it would seem to be more logical therapy to advise parents in advance of this expected infant behavior. Certainly any baby that cries excessively should be comforted. An intelligent search for the cause should be made. If hungry, the baby should be fed even though it may not be the scheduled time. Soiled or wet diapers may be changed. Air may be expelled from the stomach by burping the baby over the nurse's or mother's shoulder. Clothing may be adjusted or the baby's position in bed changed. A calm, comforting parental attitude is preferable to the panicky floor walking that is resorted to by some parents. Crying and colic are seldom troublesome factors in the home with an experienced and competent baby nurse in charge or when the baby is in the hospital attended by skilled nurses.

SUMMARY

In summary, the following major items about infant feeding at the midcentury have been emphasized:

1. The progressive decline in breast feeding has been deplored and the suggestion made that an attempt be made to reverse the trend.

2. The major historic achievements which have contributed to the present highly successful status of artificial feeding have been mentioned.

3. Certain modern practices which would seem to merit further scrutiny have been re-

viewed. These include (a) the use of concentrated mixtures in the neonatal period which may lead to tetany of the newborn; (b) the use of concentrated poorly constructed formulas following the neonatal period which impose excessive renal solute loads and endanger body water reserves; and (c) the early introduction of solid food supplements.

4. A concept of infant colic has been given.

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AN IDEAL PREGNANCY TEST requires specificity, sensitivity, simplicity, rapidity, clarity, reliability, accuracy, and low cost. Paul H. Fried, M.D., and A. E. Rakoff, M.D., Jefferson Medical College, Philadelphia, do not believe the male frog pregnancy test, which is based on the release of spermatozoa into the animal's urinary tract by injected chorionic gonadotrophin fulfills these criteria. In a study to evaluate the accuracy and reliability of the test, 75 normal pregnancies were separated according to duration into 3 groups. Group 1 consisted of pregnancies in the initial weeks of development, during which the hormone level increases rapidly to reach the highest level at about the third week after the expected date of the first missed menses. Group 2 included pregnancies in the remainder of the first trimester, during which the hormone titer remains at the peak level. Group 3 consisted of pregnancies in the last two trimesters, at the onset of which the hormone titer drops from the peak to a lower level that persists to delivery.

The highest accuracy, 92 per cent, was associated with testing during the latter part of the first trimester. The pregnancies in the initial weeks of development had the lowest group accuracy, 72 per cent.

The test was also evaluated in 54 patients with various disturbances of early pregnancy. Results varied with the general chorionic gonadotrophin levels of the several disorders. Incorrect negative results were obtained in 16 per cent of threatened abortions; in 44 per cent of inevitable, incomplete, or missed abortions; and in 50 per cent of ectopic pregnancies. The large number of false-negative results in the group with threatened abortions constitutes a serious test failure. In some cases, equivocal clinical findings and negative test results provided sufficient indication for emptying the uterus.

To improve the male frog test, urine specimens should be concentrated to increase the amount of injected chorionic gonadotrophin. Tests should be repeated weekly when initial reports are negative.

PAUL H. FRIED, and A. E. RAKOFF: *Obst. & Gynec.* 6:12-17, 1955.

ACTH, Tetracycline, and Tetracycline Combined With Cortisone in the Treatment of Infectious Mononucleosis

GARY A. CRONK, M.D., AND DOROTHY E. NAUMANN, M.D.

Syracuse, New York

DATA ON 35 infectious mononucleosis patients who were hospitalized in the Syracuse University infirmary and were treated with ACTH or tetracycline hydrochloride or tetracycline hydrochloride combined with cortisone is presented in this report. ACTH was administered to 7 of the patients and they are discussed with reference to the changes in hematology. The accepted natural course of infectious mononucleosis was followed by 17 patients who received tetracycline alone. Tetracycline combined with cortisone was given to 11 patients who appeared to have prompt regression of the inflammatory process in lymph tissue and relief of pain.

METHODS AND MATERIALS

The patients in this study were all young university students between the ages of 17 and 22. Of this group, 17 were females and 18 were males. Prior to onset of the disease, all patients had been essentially in good health.

The diagnosis of mononucleosis was established by standard hematologic and serologic findings. The patients were divided into 3 groups for the proposed therapies. The first group of 7 patients was given 25 mg. of ACTH intravenously diluted in 1,000 cc. of normal saline over an eight- to ten-hour period. During the administration of this hormone, several blood counts, total eosinophil counts, and heterophil agglutinations were performed. The results were compared with pretherapy laboratory examinations and reported as a percentage change from the original.

The second group of 17 patients received 250 mg. of tetracycline hydrochloride orally ev-

ery six hours. These patients were followed with standard clinical observations and hematologic examinations.

The third group of 11 patients was given 250 mg. of tetracycline hydrochloride and 25 mg. of cortisone every six hours. These patients were likewise followed with standard clinical observations and laboratory examinations.

RESULTS

The changes in the hematology of the 7 patients with infectious mononucleosis who were treated with intravenous ACTH are presented in figure 1. The beginning points for these observations were established by several replicate blood examinations prior to the day of ACTH administration. Several pretreatment observations on the day of ACTH administrations were markedly reduced compared to previous counts. Ignoring these facts would considerably color the subsequent observations. The reduction of circulatory eosinophils occurred according to expectations. There was likewise a reduction in total white blood count, lymphocytes, and atypical lymphocytes. These changes persisted only during ACTH administration and within twenty-four hours returned to the baseline. Repeated administration of 25 mg. of ACTH caused a similar picture to recur. Heterophil agglutination titers taken during this period did not change. This is in keeping with observations of other investigators.¹

Clinically, patients treated with ACTH alone had temporary regression of pathology. The pathology returned to the starting point after ACTH was discontinued. No evidence of compensation rebound in the pathology was noted. ACTH did not seem to influence clinical recovery.

When attempts have been undertaken during the past five years to control or influence the course of over 1,000 cases of infectious mono-

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From the department of health and preventive medicine, Syracuse University, Syracuse, New York.

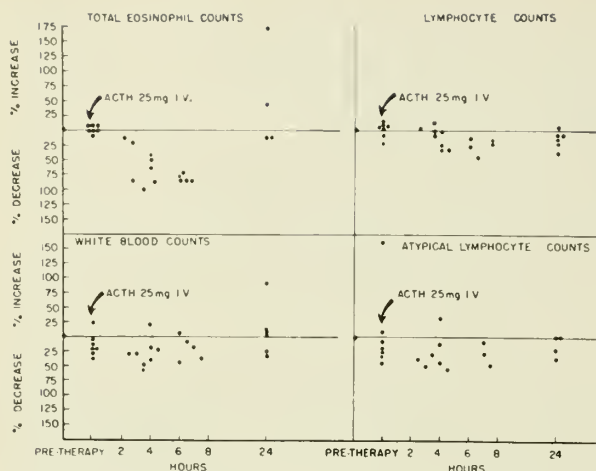


Fig. 1. Changes in hematology of patients with infectious mononucleosis after intravenous administration of 25 mg. of ACTH.

nucleosis with various chemicals and antibiotics, failure has been the general rule. This fact, which is not always apparent in some mononucleosis research projects, immediately becomes obvious under controlled conditions.²⁻⁵ The many vagaries of mononucleosis make uncontrolled interpretations of therapeutic programs hazardous. In spite of this, experience with this disease allows for fairly accurate evaluation of a new chemical or antibiotic.

The 17 patients in this series treated with tetracycline hydrochloride followed a clinical course which was similar in all respects to untreated infectious mononucleosis. No evidence of secondary bacterial invasion was noted.

The 11 patients who received 250 mg. of tetracycline hydrochloride and 25 mg. of cortisone every six hours showed pronounced changes in lymphoid tissue. Pronounced ulceration of the pharynx with thick heavy membranous formation and a large collar of cervical lymph glands were prominent in the pathology. These patients experienced dysphagia and intermittent respiratory embarrassment. The latter manifestation was so severe in 2 instances that stand-by tracheotomy equipment was maintained.

Within twenty-four to thirty-six hours, all patients in this group experienced relief of pain, dysphagia, and intermittent respiratory difficulty. Concomitant with the symptomatic improvement, pronounced regression occurred in the inflammatory process in the cervical lymph nodes

and in the nasopharynx. This type of precipitous regression of the pathology of mononucleosis would not have been expected to happen in the natural course of the disease. Unfortunately, this therapeutic attack did not alter the over-all mononucleosis repair process. From a hematologic point of control, these patients did not return to normal until four to eight weeks had elapsed.

Cortisone is not a specific but only an anti-inflammatory agent. Tetracycline gives a fairly broad antibacterial coverage and reduces hazards incident to the administration of anti-inflammatory agents. The conclusion must be drawn that cortisone-tetracycline therapy of infectious mononucleosis seems to be of distinct value in carefully chosen cases. The procedure should by no means become routine, but should be confined to cases where vital processes or nutrition may be seriously impaired.

SUMMARY AND CONCLUSIONS

ACTH, tetracycline hydrochloride, or a combination of tetracycline hydrochloride was administered to 35 patients hospitalized with infectious mononucleosis.

ACTH was given to 7 of these patients. No significant permanent change occurred in the blood picture or clinical course of the disease.

Tetracycline hydrochloride was administered to 17 of the patients. Evidence failed to show that the course of the disease was materially altered by this antibiotic.

A combination of tetracycline hydrochloride and cortisone was given to 11 of the patients who were seriously ill with the disease. Regression of lymph tissue pathology and symptoms occurred within twenty-four to thirty-six hours. The total duration of illness was not materially affected by this treatment program.

Cortisone in combination with tetracycline appears to be a valuable tool in the treatment of persons seriously ill with infectious mononucleosis. Because the pharmacologic effect of this treatment is basically anti-inflammatory, its use should be restricted to individual cases in which pathology might interfere with vital processes.

Supported in part by a grant from Bristol Laboratories, Inc., Syracuse, New York.

Tetracycline used in this project was Polycycline, Bristol Laboratories, Inc.

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George D. Haggard, M.D.

A Personal Tribute

C. A. McKINLAY, M.D.

FOR NEARLY A CENTURY Dr. Haggard has exemplified the good life in our community as he has maintained an unabated interest in the medical and lay world about him. Without robust physique, his good health, due at least in part to favorable inheritance and to temperate habits, has enabled Dr. Haggard to inherit the earth in a unique manner. Good faculties and added years, with a memory going back to the last years of Abraham Lincoln's life, compel interest from a younger generation.

Dr. Haggard was born of English and French ancestry in an unroofed log cabin on January 18, 1857, in Goodhue County, territory of Minnesota. During nine years of his life, Dr. Haggard acted as a mechanical engineer, part of the time with the Milwaukee Railroad. In 1880, he received the degree of Ph.B. from Oskaloosa College, later Drake University. Also, in 1880, he married Sucina M. Headlee (now deceased). A daughter, Mildred J., has faithfully made a home for her father throughout the years. Dr. Haggard was graduated from the University of Minnesota School of Medicine in 1893. He interned at the Minneapolis City Hospital from 1893 to 1894. The following statement by Dr. Haggard shows his independent thought processes and also his appreciation of controlled clinical experimentation.

"During internship, the Brand (cold) bath was introduced by Superintendent Dr. C. G. Weston. I stated my reservations, and, when the superintendent began to receive complaints from the patients, he came to me with a proposition that each alternate patient from that day forward was to receive the Brand bath, and the others were to have a warm bath which I suggested. I administered them all and kept a chart recording temperature, pulse, and apparent condition of the patient. Until the end of

my year, there were 48 patients recorded. The warm bath brought no complaints, and response to it was favorable without exception, so that the superintendent concluded that the claims for the Brand bath were not supported. Later came the report that Dr. Johnson, city and county superintendent for Boston, and proponent in this country of the Brand bath, had come down with typhoid fever and was given the Brand bath under counsel of his physicians. He protested that nothing on earth could persuade him to submit to another, that he would rather die. Dr. Johnson was the author of the best current therapeutic textbook." Any of us who have seen the Brand bath in use, as it was as late as 1916 in the Montreal General Hospital, would undoubtedly prefer being one of the controls with a warm bath.

Dr. Haggard's professional career continued as assistant city physician from 1900 through 1904. As instructor in physiology at the University of Minnesota Medical School from 1905 through 1911, Dr. Haggard served as epidemiologist for the Minnesota State Board of Health and for the Minneapolis City Health Department. During this period, he made the first intubation in the city for laryngeal diphtheria, devised an improved method of vaccination, and made plaster casts of the various stages of small-pox eruptions which were used in national exhibitions and later as teaching material. In the first epidemic of poliomyelitis, Dr. Haggard did field work and his detailed records were made into charts for the study of the disease.

Dr. Haggard engaged in general private practice of medicine and surgery for fifty-seven years. It is to be noted that through general practice he was able to serve his community. He exemplifies well the extremely valuable place that the well-trained general practitioner may attain in the community

when imbued with the concepts of unselfish service.

Dr. Haggard is a life member and an executive committee member of Hennepin County Medical Society. He was its secretary for six years and was vice-president and acting president in 1913. He is also a member of the 50-year club of the Minnesota State Medical Association; American Medical Association; and American Academy of General Practice. He is emeritus member of Asbury Methodist Hospital medical staff; honorary member of Northwestern Hospital staff; former member of the medical staff of Norwegian Deaconess Hospital; and former member of the clinical staff of St. Barnabas Hospital. During the first World War, he served as medical examiner to the selective service system; later he

received a commission as First Lieutenant in the Army Medical Corps.

Dr. Haggard has been an active member of the Portland Avenue Christian Church, now the First Christian Church, for many years and has participated in many phases of its work. His life is an open expression of the faith which is vital to him. All who know Dr. Haggard will want to join in wishing for him years of continued good health and in expressing appreciation of his contribution to the community. In the hearts of all his friends and acquaintances, Dr. Haggard fills a special place because of the faithfulness, unselfishness, and the spirit of service which have made him an outstanding example of the true physician in his relationship to the patient.

Salivary Gland Tumors, by DONALD E. ROSS, 1955. Springfield, Illinois: Charles C. Thomas. 86 pages. \$7.50.

This monograph presents a nice pictorial display of the anatomy involved in surgery of the parotid gland. The author also describes methods of repair to be used when a portion of the facial nerve must be removed. A general discussion of the problem of neoplasms of the salivary glands is presented; in which are included a section on history, histogenesis, microscopic pathology, and a general discussion of the results following surgical therapy of the various types of neoplasms of the salivary glands. The strongest feature of this book is the description of the surgical procedures involved in the treatment of lesions of the parotid gland along with the anatomic illustrations of this region. The weakest section is that dealing with true malignancies of the parotid gland as opposed to the mixed tumors. The author's series is scarcely large enough to come to any valid conclusion regarding prognosis or indication for enlargement of the classical operation by methods such as radical neck dissection.

FLETCHER A. MILLER, M.D.



Marriage, A Medical and Sacramental Study, by ALAN KEENAN, O.F.M., and JOHN RYAN, M.D., 1955. New York City: Sheed and Ward. 337 pages with glossary and index. \$4.50.

With all the attention that is focused today on divorce, the apparent decay of the family, and on the morals (or lack of them, as you wish) of the younger generation, the necessity for a reorientation of our thinking on marriage and the problem of sex education for the young is agreed upon by all. The direction which that reorientation will take is a matter of some dispute. This special book, written by a medical doctor and a Roman Catholic priest in collaboration, stating both the medical and sacramental aspects of marriage and emphasizing as it does

the integration of the two, goes far toward presenting the Catholic position on the problems mentioned.

Medically, the book appears aimed at the lay reader, and though basically sound, it is never too technical. Those aspects of marriage which raise medicomoral problems both for the physician and the married partners, such as birth control, sterilization, and artificial insemination, are dealt with squarely from both the Catholic and non-Catholic point of view.

The last section of the book deals with the adolescent problems of sex, sex education, and premarital instruction. While emphasizing the importance of the parents' role, a method of sex education is given which the author has found useful in a private school.

This book should be of value to the Catholic physician, both in the realm of marriage counseling and in the solution of medicomoral problems. But perhaps its value will be of more importance to the non-Catholic physician, for in presenting an intelligent and integrated picture of the Catholic viewpoint it should enable him to treat his Catholic patients in a more knowing and sympathetic fashion.

G. F. BURKE, M.D.

American College Health Association . . .

The Committee on Tuberculosis is seeking volunteers among members of the American College Health Association who might wish to participate in a research program on tuberculin testing. The program is being jointly sponsored by the National Tuberculosis Association and the Public Health Service. Anyone interested is asked to contact Dr. Max Durfee, Oberlin College,

Oberlin, Ohio, chairman of the Committee on Tuberculosis.

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Edith Lindsay, Ph.D., University of California, Berkeley, has been named chairman of the Special Committee, "A Permanent Association Office and Staff: Studies to
(Continued on page 30A)

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Develop Specific Plans," by Dr. John W. Brown, president of the American College Health Association. Other members of the committee are Irvin W. Sander, M.D., Wayne University, and Norman S. Moore, M.D., Cornell University.

Opal Thorpe, R.N., Central Michigan College of Education, Mt. Pleasant, Michigan, has been added to the Committee on the Function of the College Nurse.

The University of Michigan will break a thirty-three year tradition next fall by requesting all incoming new students to obtain their own physical examinations.

Dr. Morley Beckett, director of the Student Health Service, states that this will relieve the increasing job of examining the rapidly growing classes as they enter the school. Some 6,000 students were examined last fall.

Two openings for student health service directors have been made known to this office in the past few weeks.

A southern university of about 5,000 male students has written to the secretary's office that it is desirous of changing its health service directorship from a part-time to a full-time position. The university is interested in hearing from any physician experienced in student health work who is interested in making a change. Send any such letters to this office.


New Mexico College of Agriculture and Mechanic Arts, State College, New Mexico, is seeking a replacement for their medical director who is retiring at the end of the present fiscal year. Student health physicians interested in this position should contact Philip S. Ambrose, dean of students.

News Briefs . . .

North Dakota

THE FOLLOWING PHYSICIANS were granted licenses to practice in North Dakota by the State Board of Medical Examiners on January 7, 1956: Frederick L. Behling, Fargo; Harvey S. Brodovsky, Winnipeg, Manitoba; D. Murray Cameron, Kulm, N. D.; Joseph W. Cleary, Bismarck, N. D.; Raymond L. Coultrip, Jr., Sharon, N. D.; John D. Condie, Mohall, N. D.; Perry H. Engstrom, Wahpeton, N. D.; Norman M. Helgason, Cavalier, N. D.; Bohdan Z. Hordinsky, Drake, N. D.; Hans Kuisk, Rutland, N. D.

(Continued on page 32A)



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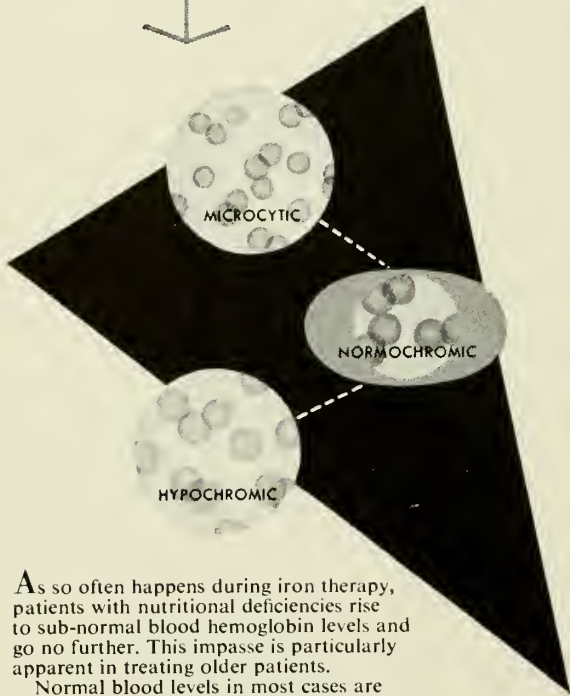
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NEWS BRIEFS

(Continued from page 30A)

James R. McDougall, Kenmare, N.D.; Karl F. Oja, Ashley, N.D.; John C. Palmer, Jamestown, N.D.; John L. Smith, Fargo, N.D.; Jaroslaw Terlecki, Minnewaukan, N.D.; Marvin J. Towarnicky, Winnipeg, Manitoba; Harry D. Tripp, Jamestown, N.D.; Robert J. Ulmer, Fargo, N.D.; and H. Charles Walker, Jr., Fargo, N.D.

MEMBERS OF THE NEWLY FORMED disaster committee of the Grand Forks District Medical Society are: Drs. R. E. Mahowald, chairman; A. E. Culmer, Jr.; and Jack W. Revere. The committee was set up to function in cases of general emergency, at which time it would be integrated with civil defense and police and fire departments to work for the public good.

DR. H. M. BERG, a radiologist with the Quain and Ramstad Clinic since 1929, has been elected to the board of directors of the Radiological Society of North America.

DR. PAUL V. ADAMS, of Langdon, has been appointed health officer for Cavalier County, succeeding the late Dr. A. D. Strom. Dr. Adams began his medical practice in Langdon in 1953 as a partner of Dr. David Peterkin. He was previously associated with a clinic in Winnipeg.

DR. H. CHARLES WALKER, JR., has joined the Craven-Hagen Clinic in Williston as head of the department of internal medicine. In 1952 and 1953, Dr. Walker did research in heart disease and obesity at Dr. Ancel Keys' Laboratory of Physiological Hygiene at the University of Minnesota. In 1954, he was resident in chest diseases at Blue Ridge Sanatorium, Charlottesville, Virginia. From January 1955 to the present time, he has been on the staff of internal medicine and in charge of the dermatology service at Fargo Veterans Administration Hospital.

Minnesota

THE ROCHESTER STATE HOSPITAL has received for the second time a grant from the United States Public Health Service for continued research in intracerebral electrography in the human. The fund this year amounts to \$18,994. This research has also been supplemented by funds from the Minnesota Department of Public Welfare.

DR. THORSTEN SMITH has been appointed clinical director of the Faribault State School and Hospital. He has had extensive experience with the mentally retarded as supervising psychiatrist at Letchworth Village, a New York state institution. Before his appointment, Dr. Smith practiced psychiatry in Eau Claire, Wisconsin.

DR. THOMAS LOWRY, chief of staff at General Hospital, Minneapolis, has been named to the Glen Lake Sanatorium Commission by the Hennepin County Board of Commissioners. Dr. Lowry, also clinical professor of medicine at the University of Minnesota, was chosen from a slate of three physicians suggested to succeed Dr. S. Marx White, who resigned after serving on the commission for thirty-six years.

DR. P. J. PANKRATZ, Mountain Lake physician, has been invited by the Mennonite Central Committee to serve as head of a hospital in Hwailein, Formosa for a four-year term. Dr. Pankratz expected to leave about March 1.

DR. HERBERT F. R. PLASS is the new chief of staff of Abbott Hospital, Minneapolis, succeeding Dr. Ralph Creighton. Other officers are: vice president, Dr. Tague C. Chisholm; secretary, Dr. Richard R. Flihr; and members of the executive committee, Dr. Herman E. Drill, Dr. Karl E. Sandt, and Dr. Robert Semsch.

Advertisers' Announcements

ALEVAIRE BENEFITS PEDIATRIC LUNG INFECTIONS

A drop from 35 to 2.6 per cent in the mortality rate of infants and young children with respiratory diseases is attributed to aerosol inhalation of the mucolytic detergent Alevaire (Winthrop Laboratories, New York City).

In a group of 38 patients treated with Alevaire, antibiotics and supportive measures, 1 death is reported. In contrast, 11 deaths occurred in a series of 31 children given antibiotics and supportive treatment alone. In both groups, children were under 5 years of age, and the majority were less than 1 year old. They suffered from a variety of bronchopulmonary diseases in which excess formation of thickened mucus was a serious problem; many cases exhibited pronounced dyspnea and rib retraction.

In almost all cases given nebulized Alevaire, improvement of dyspnea was noted in the first twenty-four hours of continuous inhalation. A thinning of viscid secretions was noted which permitted "gasping and choking" patients to breathe more easily.

Improvement of breathing was seen only after the third or fourth day in patients of the group who received only antibiotics and supportive treatment.

UPJOHN LAUNCHES SCOPE WEEKLY

The first weekly newspaper for physicians and their associates in the medical profession has been issued by The Upjohn Company, Kalamazoo, Michigan. Volume 1, Number 1 came from the presses January 1 and published, among other "News from the Medical Journals," a substantial excerpt from the "scoop" paper of William Peterson, Ph.D., and Berry Campbell, Ph.D., which appeared in the November JOURNAL-LANCET regarding protection against disease by antibodies ingested.

Pictured in connection with the notice of Upjohn's January 18 closed-circuit TV discussion are the University of Minnesota's Dr. Owen H. Wangenstein and Dr. Leo G. Rigler.

The newspaper presents reports from foreign medical meetings, a special "News from the Capital" column, reviews of new medical books, and articles on the challenges of medical research. Also included are entertainment features, such as cartoons, crossword puzzles, and a column of interest to the physician's family.

LAKE SIDE INTRODUCES PEDIATRIC PIPTAL

Lakeside Laboratories, Inc., Milwaukee, Wisconsin, has announced a new prescription product, Pediatric Piptal, a palatable liquid that has been found effective in the treatment of infants' colic. It is also indicated for related functional pediatric gastrointestinal disorders.

In clinical investigations, Pediatric Piptal has been administered by dropper about fifteen minutes before feeding time and has usually helped to relieve crying and other symptoms in twenty-four hours. Drowsiness, flushing, and other effects have not been encountered. Investigators have reported that the number of feedings required per day has been restored toward normal; in 1 notable case, feedings were reduced from 12 to 5. Piptal, a cholinolytic developed by Lakeside, is widely prescribed for the management of peptic ulcer.

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Calcidrine, a new, improved formula with an apricot flavor and color, is effective for cough due to colds. Each 30 cc. contains: dihydrocodeinone bitartrate, 10 mg.; Nembutal sodium, 25 mg.; ephedrine hydrochloride, 25 mg.; and calcium iodide, anhydrous, 910 mg. in a palatable, aromatic syrup. Its action is mucous liquifying,

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antispasmodic, sedative, and inhibitory to the cough reflex in cough due to colds. For adults and children, the product is made by Abbott Laboratories, North Chicago, Illinois.

HOMAGENETS FOR NUTRITIONAL DEFICIENCIES

S. E. Massengill Company of Bristol, Tennessee, has begun marketing a candy-like kind of vitamin tablet, Homagenets, made by a new process of homogenizing vitamins. Homagenets, made in pediatric, prenatal, and therapeutic varieties with different components, can be either chewed, swallowed, or allowed to dissolve on the tongue. The pediatric Homagenets are orange flavored and are supplied in 40-tablet bottles; the prenatal variety is mint flavored and comes in 100-tablet bottles; and the therapeutic kind has a chocolate flavor and is in 50-tablet bottles. Distribution is national, direct and through service wholesale druggists.

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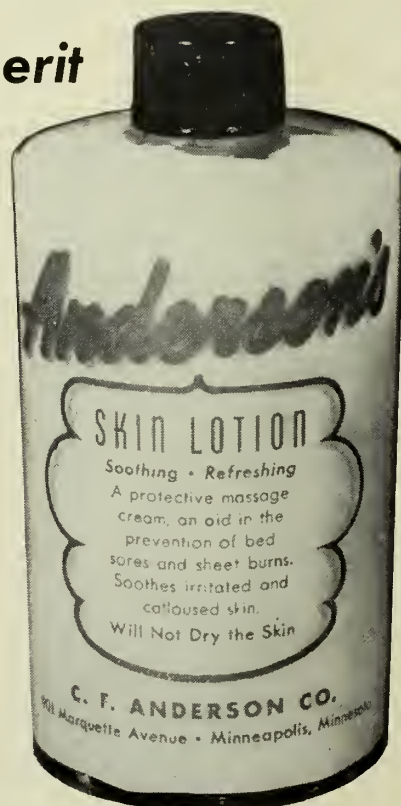
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COMING in *May* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- Operations for the relief of pain are not necessarily drastic procedures. Yet, surgical measures are often withheld until all else has failed. To withhold an operation until a patient becomes a poor operative risk or addicted to narcotics is not proper planning. "The Surgical Treatment of Pain" by Wallace P. Ritchie, M.D., of St. Paul, discusses various operative procedures for the relief of intractable pain, such as posterior rhizotomy, spinothalamic tractotomy, sympathectomy, and prefrontal lobotomy. Although surgical therapy may be attended by risks and disturbing side effects, in an incurable patient, side effects are acceptable if the pain is relieved.

- Michael L. Mason, M.D., of Chicago, feels that the most important feature in burn care is the observation of the clinical course which is often neglected in favor of laboratory examinations. His paper "Treatment of Burns" outlines a plan for the care of the severely burned patient from the time of admittance to the hospital to the later stages of skin grafting and final physical and psychologic rehabilitation. The importance of directing management at all stages toward prevention of infection and correction of physiologic disturbances is stressed.

- In his paper, "Osteoid Osteoma," George M. Hart, M.D., of the Northwest Clinic, Minot, North Dakota, recommends surgical excision of this benign tumor for the relief of pain. Healing may occur after a number of years without resorting to surgery, but pain is usually severe. Complete and careful removal of the nidus assures relief of pain, and the tumor does not tend to recur.

- "Idiopathic Pulmonary Hemosiderosis" by Frances E. Schaar, M.D., and Leo G. Rigler, M.D., includes a review of the literature and presentation of a case history of a patient with this rare and often fatal disease of childhood. The pathogenesis is unknown, but clinical and roentgenologic features of the disease are distinctive. Diagnosis may be difficult because symptoms often resemble other conditions, such as cardiac failure, suggested by recurrent attacks of dyspnea, cyanosis, tachycardia, and pallor. Roentgen studies are an important diagnostic aid, characteristically revealing mottled shadows and diffuse speckling throughout both lung fields.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA POSTGRADUATE COURSES

A course in Radiology for General Physicians will be presented April 16 to 18.

A course in Electrocardiography for General Physicians will be given May 7 to 12.

AMERICAN COLLEGE HEALTH ASSOCIATION

The 1956 meeting of the American College Health Association will be held at the Nicollet Hotel, Minneapolis, May 17 through 19. The University of Minnesota will be the host school. Dr. Ruth Boynton, director of the University of Minnesota Students' Health Service, is chairman of the local arrangements committee.

REGIONAL MEETING FOR SURGEONS

The International College of Surgeons will hold a regional meeting in Madison, Wisconsin, April 26 to 28, with headquarters at the Loraine Hotel. Leading surgeons throughout the United States will appear on the program.

AMERICAN TRUDEAU SOCIETY

The annual meeting of the American Trudeau Society will be held concurrently with the annual meeting of the National Tuberculosis Association at the Statler Hotel, New York City, May 21 through May 24. For reservation blanks for local events, write the National Tuberculosis Association, 1790 Broadway, New York City 19.

MEDICAL LIBRARY ASSOCIATION

The fifty-fifth annual meeting of the Medical Library Association will be held June 18 to 22 at Hotel Statler, Los Angeles. For further information, write Mrs. Ella Crandall, Librarian, Los Angeles County General Hospital, 1200 North State Street, Los Angeles 33.

HARLEY E. FRENCH LIBRARY

The facilities of the Harley E. French Medical Library at the University of North Dakota are available to all physicians and auxiliary medical personnel of North Dakota. Books and journals may be obtained by writing Miss Loretta Swift, Librarian.

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FOREWORD

THE APRIL ISSUE of the JOURNAL-LANCET again includes many excellent papers on tuberculosis and other diseases involving primarily the chest, but I wish to call particular attention to the reproduction of the "Postscript" by Dr. Edgar Medlar, 1954 recipient of the Trudeau medal of the National Tuberculosis Association. He is one of the country's most meticulous pathologists, and he has been particularly interested in the macroscopic and microscopic aspects of tuberculous lesions.

Dr. Medlar has not been content merely to study painstakingly tuberculous tissues in innumerable specimens from persons known to have had tuberculosis and from persons dying from causes other than tuberculosis, but, with the breadth of interest and vision characteristic of the true scientist, he has welded these findings into chains of inference extending into fields beyond that usually thought of as the province of the pathologist, with resulting benefit to others involved in tuberculosis control programs, particularly the public health administrator and the epidemiologist.

Dr. Medlar's revelation of the frequency of the presence of infectious or potentially infectious tuberculous lesions in lungs of persons not suspected of having tuberculosis and the inferences he draws from these facts and animal experiments should have a sobering effect on the overly optimistic individuals who jump to the conclusion that the tuberculosis problem is a thing of the past because of the admittedly gratifying reduction in the immediate case fatality rate of tuberculosis through the use of the newer drugs. Unfortunately, although the new drugs are a most helpful addition to our armamentarium, they are not a substitute for the tedious but progressively successful tuberculosis control program developed painstakingly over the last half century which will lead eventually to our goal of eliminating all tuberculous infections, in other words, to the goal of no reactors to the tuberculin test.

Actually, I am a little more conservative than Dr. Medlar in one respect. Although I grant his evidence and the evidence of others concerning the importance of exogenous infection in producing the so-called reinfection type of tuberculosis, I think the evidence as a whole indicates that a relatively greater role is played by endogenous infection, that is, the breakdown of an earlier acquired primary infection. In other words, if by magic we could eliminate today all new infections, we already have a stockpile of about 50,000,000 people in this country harboring live, virulent tubercle bacilli in their bodies. These individuals will produce a very substantial number of active cases of tuberculous disease year after year for decades to come unless some means is found to prevent such breakdowns or to destroy the tubercle bacilli now in their bodies.

JAMES E. PERKINS, M.D.,
Managing Director, National Tuberculosis Association

The Behavior of Pulmonary Tuberculous Lesions

A Pathological Study*

E. M. MEDLAR, M.D.

Ithaca, New York

THE FOREGOING presentation of the various studies is concluded with a sense of dissatisfaction. Despite the progress that has been made toward an understanding of a complicated pathologic process, questions remain unanswered which are fundamental to a complete knowledge of the dynamics of tuberculous disease. Long observation has convinced the writer that bed rest, collapse of the lung, and chemotherapy, wisely used, all are good "delaying actions." These help to reduce the mortality rate and to restore the majority of tuberculous patients to a state of health that is not infrequently maintained by a restriction of physical activities. Nevertheless, the pathologic evidence is overwhelming that the disease commonly remains in a suppressed unhealed state even in persons who present the picture of health.

Throughout these studies the writer has sought to obtain a comprehensive understanding of the problem of tuberculosis. This has led to a rather close examination of the thinking of the clinician, the surgeon, the epidemiologist, and the public health officer which forms the body of ideas for the various programs aimed at control of the disease. This may seem to be an unorthodox pursuit for a pathologist. Nevertheless, it is believed that the function of a pathologist should extend beyond the development of a nicety and precision of laboratory techniques and the rendering of an accurate diagnosis on a specimen. He should attempt to translate what he observes into terms which will enable those who care for the sick and those who formulate public health programs to understand the dynamics of disease processes with which they have to deal. Furthermore, his investigative endeavors should be directed, in part at least, to the study of pathologic problems suggested by other fields of inquiry.

Controversy concerning the problem of tuberculosis is much livelier today than it was twenty-

five years ago.^{*} This is a most healthy state of affairs since it clearly indicates that the problem has not been solved; otherwise, a meeting of the minds would have occurred. It will be fortunate if this controversy leads to acquisition of new knowledge and formulation of sounder concepts.

In the past quarter of a century, six major events have occurred which have had a profound impact on the thinking about the problem of tuberculosis. These are: (1) the program of public education, (2) the impressive decline in the death rate from the disease, (3) the introduction of prophylactic vaccination, (4) the advent of promising chemotherapy, (5) the greatly renewed interest in the life processes of the tubercle bacillus, and (6) the use of surgery either to collapse the lung or to resect the area of pulmonary disease.

I would like to consider briefly the way in which basic pathologic facts may be related to each of these rather disjointed events.

No one will dispute the need for education, even continuing education, concerning tuberculosis. One may question, however, where such education should begin and what sort of an educational program should be pursued. The writer has had the interesting experience of witnessing the reaction of three medical students to the contents of Chapter 1 of the present monograph. Each of these students had taken his course in pathology in prominent medical schools since 1949. Each expressed surprise that there should be any question of the validity of the basic concepts of the disease which had been taught in 1925 and which are still being taught. This suggests that during the past two decades considerable progress has been made toward an understanding of the pathogenesis of pulmonary tuberculosis, and it is unfortunate if the oncoming members of the medical profession are not being

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*Reprinted from Chapter 11 of *American Review of Tuberculosis and Pulmonary Disease*, Vol. 71, part 2, pages 232-242, March 1955, by permission of the author, editor, and managing director of the National Tuberculosis Association.

made aware of the newly acquired knowledge.

It is recognized that many pathologists are interested in tuberculosis only from a diagnostic standpoint and prefer not to do necropsies on tuberculous subjects. Directors of departments of pathology have frankly stated that, since all of the pathologic facts about tuberculosis were already known, the writer was wasting his time in studying the disease. Professors of pathology have been heard to state that there is nothing of less interest than a tuberculous cavity of a lung. Surely such attitudes would not be voiced were pathologists more conversant with the clinical and socioeconomic problems in tuberculosis.

It seems to the writer that a better control of tuberculosis would be possible if the dynamics of the pathologic process were properly presented to medical students who, after all, are to become the practicing physicians of tomorrow. This assertion is made because, in most instances, the first responsible person to have an opportunity to recognize a case of tuberculosis is the practicing physician. It is at this time that the fate of many patients is determined.

Perhaps one should go across the hall to the department of public health and hygiene and suggest that the teaching of the epidemiology of tuberculosis would not suffer from an inclusion of basic information about the pathogenesis of the disease. It is an interesting exercise to show, by graphs, how steadily the mortality rate from tuberculosis has declined during the past fifty years. From such demonstrations, one can easily be led to the conclusion that soon tuberculosis no longer will be a problem; a situation which could come to pass if it were true that the mortality rate indicated the major hazard. Unfortunately, this is not so. The major problem revolves about the surviving tuberculous persons who harbor smoldering unhealed disease.

Another aspect of this situation is the not uncommon presence of a tuberculous person who has had stationary pulmonary shadows for many years and who, if thoroughly investigated bacteriologically, would be found to be shedding tubercle bacilli. Patients with disease of this nature can properly be considered as chronic carriers. Probably they are the source from which an annual crop of new patients acquire the disease.

It is of much greater importance to obtain accurate and reliable data on morbidity and relapse rates than to reiterate year after year that the mortality from tuberculosis is declining. In this way, the major problems in tuberculosis can be given due consideration. From his many visits to the residencies of the tubercle bacillus, the

writer has come to appreciate that the future of this parasite is served best by a host who does not die and who remains sufficiently healthy so that a physician's services are not sought. Or, if a physician is consulted, the situation is probed no further than to diagnose "chronic bronchitis," "cigarette cough," or "a touch of asthma."

Another aspect of the problem deserves comment. During the past decade there has been an increasing appreciation that deaths from tuberculosis now are most numerous among white males of more than 40 years of age. To explain this phenomenon, it has been proposed that these males are a vestige of the exceedingly high incidence of tuberculous infection which is commonly supposed to have existed thirty to forty years ago. On this basis it is argued that tuberculosis is on its way out. Reasoning of this nature has come to be accepted because there is no large volume of statistics to indicate that there is such a condition as reinfection tuberculosis, that is, a new progressive infection in a person in whom a previous infection had completely healed. There is a certain amount of roentgenographic evidence that some persons develop progressive disease after middle life. However, such evidence has commonly been used to support the allegation that the disease had been dormant probably since childhood.

In the writer's necropsy studies, an attempt was made to find evidence for and against this concept. Little evidence was found in support of this concept and there was considerable evidence against it. Necropsies on persons more than 40 years old who died from pulmonary tuberculosis could be separated into two groups. In one group, the presence of old scars, calcified foci, and old necrotic lesions clearly indicated that a chronic disease of many years' duration was present. In this group, the condition found in lymph nodes associated with either the pulmonary or the gastrointestinal system suggested that the pulmonary disease was either a chronic progressive primary or a chronic progressive reinfection disease; more often the former than the latter. In the other group, no evidence was found that the disease had been of many years' duration. It was observed on several occasions that the only significant difference between the tuberculous lungs from older persons and those from persons who died in their twenties was that there was considerably more anthracotic pigment in the aging lungs. There appeared to be a preponderance of reinfection tuberculosis in this second group of older persons.

In necropsies in general, so little attention has been given to a separation of pulmonary tuber-

culosis into progressive primary and progressive reinfection disease that there is an insufficient volume of reliable data to make possible a statistical evaluation of the incidence of reinfection disease in persons more than 40 years old. Nevertheless, the writer is convinced that progressive reinfection pulmonary tuberculosis is a reality and that tuberculosis can be acquired at any age. There is no justification for complacency with regard to tuberculosis in older persons, and, in the writer's opinion, it is erroneous to consider tuberculosis in this age group as a common vestige from previous decades.

Tuberculin surveys have become an accepted part of the program of public education and the writer is in full accord with the purpose of this procedure. It has shown clearly that only a small percentage develop progressive pulmonary tuberculosis among those who become reactors to tuberculin. The data discussed in the chapter on necropsy studies indicate the reason for this phenomenon. A pathologic lesion, that is, disease, commonly develops, but progressive disease infrequently ensues because of the location of the lesion. The evidence submitted in the chapter on "minimal" pulmonary tuberculosis indicates that considerable delay may occur between the time an individual becomes a reactor to tuberculin and the time progressive disease is found. From this it would seem that the incubation period, the lapse of time between the acquiring of the infection and the clinical manifestation of that infection, would be most unpredictable in tuberculosis. It is suggested that this situation is related to difference of behavior in different persons of the minute *initial* lesion which is too small to be visualized in a chest roentgenogram.

Another feature of the educational program is the emphasis which is given to chest roentgenograms for individuals and for entire communities. The writer is in accord with the purpose of this program. There are, however, some pitfalls in the program which need emphasis. Seldom does a community roentgenographic survey include more than 80 per cent of the residents. This leaves a fairly large segment in which spreaders of the disease may remain undetected. It is well known that not infrequently persons with "chest trouble" avoid having a roentgenogram taken of their chest. Furthermore, the program fails to take into account the problem of reinfection tuberculosis and also the unpredictability in the subsequent behavior of the disease which, from roentgenographic appearance, seems to be of no "clinical" significance. The writer has personally seen several instances of the lat-

ter condition in which the person died from extensive disease several years later. These instances have all been in older persons and in males. In these days innocuous-appearing pulmonary shadows in younger adults usually are given careful scrutiny.

It cannot be emphasized too strongly that a single roentgenographic survey of a community cannot predict the future problem of tuberculosis in the community any more than a single chest roentgenogram of an individual can guarantee the future possibility of serious pulmonary tuberculosis in that person. These problems are related inherently to the dynamics of the disease.

Pulmonary tuberculosis is an endemic disease and, since it is air-borne, it can be considered as a herd disease, that is, the tubercle bacillus must gain entrance to the pulmonary tissue of a considerable number of persons in order that a small percentage may develop a progression of the disease. This is clearly shown in the necropsy studies of cases of sudden and unexpected death in which only 20 per cent of those who evidenced infection showed that the disease had progressed to some extent. Of these, only one-fourth showed open cavity formation, the most favorable situation for the contamination of the air through coughing. A somewhat similar situation was found in the general necropsy records of large general hospitals. Most of these cases were in males more than 40 years of age and were unrecognized clinically. In the writer's opinion, this endemic disease will persist, even if the mortality rate becomes negligible, unless some way is found to detect and to segregate this minute percentage of the population. Moreover, this is the feature of the problem in which reinfection tuberculosis in persons beyond middle age becomes a major issue.

Only those who are intimately engaged in the care of tuberculous patients have a keen appreciation of the socioeconomic problem that the disease creates. Recently a newspaper from a city in upstate New York announced that not a single death from tuberculosis had occurred in that county during the previous year. In the same news item it was also stated that there were more known living tuberculous patients than there were ten years previously. During the previous year, 19 new cases of the disease were reported, whereas in the five years before that there had been an annual average of 23 cases. This situation rightly de-emphasizes the mortality rate from the disease and brings into prominence the socioeconomic problem.

On the social side, the problem is one of wrecked lives and broken homes. To a consid-

erable degree this problem revolves about an unreasoning fear of the disease. This is well illustrated by a question recently asked by a tuberculous patient, that is, whether tuberculous people should develop a "complex" about their disease. When asked what he meant he replied that it seemed best not to talk about the subject among his friends.

The economic phase of the problem manifests itself in several ways. Many tuberculous persons are unable to compete successfully on a job with healthy persons. Employment is denied either because of a social fear or because of a possible liability for monetary compensation. Public health laws forbid a person with sputum positive for tubercle bacilli to work, especially in several categories of employment. The disease has been made compensable in some states, with the employer held responsible for the compensation. This has had an unfortunate effect in one respect. It has caused many hospitals to refuse to have any recognized tuberculous cases among their patients, and in this way makes impossible instruction to medical and nursing personnel with regard to tuberculosis. The writer is familiar with one instance in which this situation has deprived the department of pathology of sufficient material to teach medical students. Millions of dollars still are spent to find new cases and to rehabilitate the known cases, and there appears to be no end in sight to the expenditure of such sums of money. A thoughtful consideration of the many ramifications of the economic problem certainly should cause one to be most dissatisfied with the limited progress that has been made in the solution of the problem.

Perhaps there has never been a more spectacular attempt to eradicate tuberculosis than has been undertaken during the past decade by prophylactic vaccination with BCG. For a number of years, extensive animal experiments on BCG vaccination were carried out under the writer's direction at the Hegeman Memorial Laboratory at Mt. McGregor, New York. From this experience it can be stated unreservedly that, while such vaccination confers a degree of protection, it falls short of being completely effective.

In the world-wide program of prophylactic vaccination, two fundamental pathologic facts have not been given due consideration. The first is that a natural primary infection with virulent tubercle bacilli fails to prevent reinfection of the lungs. It would seem unlikely that a tubercle bacillus which has largely lost its pathogenic properties would confer a degree of immunity higher than that which follows infection by fully pathogenic bacilli.

The second fact is that progressive pulmonary tuberculosis rarely develops unless the bacilli happen, by chance, to lodge in a "vulnerable" spot in the lung. This pertains both to primary and to reinfection disease. Because of the peculiar nature of the pathology, it is doubtful that any sort of vaccination can eliminate the problem of pulmonary tuberculosis. On the other hand, animal experimentation suggests that prophylactic vaccination well may lessen the occurrence of the generalized disease which is more frequently encountered in a progressive primary infection than in a progressive reinfection.

Now that the pangs of birth of the chemotherapeutic era are over, it would seem appropriate to scrutinize the lusty infant in a spirit of constructive criticism. A quarter of a century ago the word "cured" was used frequently in the assessment of the end result of sanatorium treatment. A decade ago the word "arrested" had replaced the word "cured." This change in the use of words reflected wisdom gained from experience. Now, with chemotherapy, the word "cured" has again come into use, and the writer questions the wisdom of this change in terminology. In his opinion there have been some unwarranted and too optimistic assumptions relative to chemotherapy in tuberculosis and, unfortunately, a rash of ill-advised publicity has occurred with regard to "miracle" drugs. No one need question the beneficial effects of chemotherapy during its administration, and yet one may seriously question the long-range effect on the "curing" of the disease.

Unfortunately the guinea pig and the mouse have been used to determine, experimentally, the effectiveness of chemotherapeutic agents in tuberculosis. In these animals, the experimentally produced disease is a progressive inflammatory process that ends in death in a matter of several weeks. In the experimental infections in mice and guinea pigs which are customarily employed, the necrotic (caseous) lesion that is a prominent feature in the human disease is not allowed to develop before treatment is started. As a consequence, one finds no residual necrotic lesions in these animals after chemotherapy, whereas such lesions in man persist regardless of the length of time a chemotherapeutic agent is given. It is mainly in lesions of this nature in man that tubercle bacilli are harbored. The guinea pig and the mouse serve admirably for the screening of possible chemotherapeutic agents. However, in the writer's opinion, it is necessary to establish a *chronic* disease in animals in which the necrotic lesion is a prominent feature and then determine how effective chemotherapeutic

agents may be in the "curing" of this disease. Under proper conditions this sort of a disease can be established in the rabbit. The reason for this point of view is that all newly discovered cases of pulmonary tuberculosis in man already have necrotic lesions to a greater or lesser extent.

It appears to the writer that from the outset the chemotherapeutic regimens were devised as if pulmonary tuberculosis was analogous to pneumonic lesions caused by many other bacterial agents. In the beginning the criteria for the selection of patients to be treated required that acute "exudative" disease be present or that acute generalized disease or meningitis be manifest. This practice was obviously necessary when the object was to prove that antimicrobial drugs could affect tuberculosis in humans. Nevertheless, the practice automatically excluded a large proportion of the patients present in tuberculosis hospitals. If chemotherapeutic agents can actually "cure" tuberculosis, there is no valid reason why the "chronic" advanced cases cannot be so affected. This does not mean that normal lungs will be obtained, for parenchymal scarring is usually the residue of healed tuberculosis.

On several occasions the writer heard physicians state that chemotherapeutic agents put out the "fire," but they cannot be expected to remove the charred remnants. These charred remnants referred to roentgenographic shadows that persisted after the "fire" had been put out and supposedly were pulmonary scars. Again this reflects an attitude that tuberculous disease is essentially an acute inflammatory process. From the data presented in the previous chapters, it should be evident that a considerable part of the roentgenographic shadows which persist subsequent to chemotherapy is composed of unhealed necrotic lesions, many of which were present before chemotherapy was instituted. It is unfortunate that the chronic phase of the disease has not been given due consideration in the formulation of chemotherapeutic regimens.

The writer has had the time and opportunity to study resected tuberculous pulmonary tissue from more than 500 patients. Among these have been cases of minimal and of advanced disease. With few exceptions the resections have been done during the course of chemotherapy. The chemotherapeutic agents have included streptomycin, viomycin, para-aminosalicylic acid, and isoniazid, mostly administered in one or another multiple-drug regimen. The tissues have been resected at any time from two months to three years after the institution of chemotherapy.

From this study, the writer is convinced that these agents can affect tuberculous disease as

penicillin can affect acute pneumococcal pneumonia. However, there is one fundamental difference between these two disease processes; in the pneumococcal infection there is no necrosis of tissue, whereas in tuberculosis the process of necrosis is always present and not infrequently is a dominant feature.

It is recognized that necrosis of tissue does occur in some acute pneumonic infections, that is, acute abscesses caused by aspiration of infected material, infection with *Klebsiella pneumoniae*, with streptococci, and with staphylococci. However, in such cases there is a distinct, although subtle, difference in the necrotizing process from that in tuberculosis. In the acute necrotizing infections, abscesses are formed and the necrotic tissue is liquefied and expectorated rather promptly. In tuberculosis, the abscess formation commonly is aborted before liquefaction occurs, and, as a result, the necrotic lesion, commonly called "caseous," remains intact for an indefinite period. There is no convincing evidence that the necrotic lesion is affected by chemotherapy, and too often evidence of liquefaction of these lesions still persists after a year or more of chemotherapy. It is this feature that separates tuberculosis from practically all other bacterial infections of the lung. It is the unpredictable behavior of the necrotic tuberculous lesions that makes it necessary to use prolonged chemotherapy and that also makes it most difficult to determine the length of time chemotherapeutic agents should be used.

With the inclusion of all sorts of tuberculous cases, a considerable change has occurred in the use of chemotherapeutic agents. At present it would seem that neither the problem of the length of treatment nor the one of the combination of chemotherapeutic agents has been resolved. This brings to better perspective the chronic phase of the disease, which proved to be the stumbling block prior to chemotherapy.

It has been suggested that it might be best to treat persons chemotherapeutically as soon as they become reactors to tuberculin. This could be a good idea, provided one could be sure that a progressive disease was underway. However, the large majority of persons who become infected with tubercle bacillus completely heal their minute infection without aid of a physician.

The publicity given to "miracle" drugs plus the developing tendency to treat patients at home and on an ambulatory basis are greatly complicating the management of the problem of tuberculosis. One of the effects of this situation is that the census in tuberculosis hospitals is on the decline. Another effect is that outpatient

clinics are on the increase. Whether the present trend is wise remains to be proved. The policy to treat tuberculous patients at home and on an ambulatory basis may have a popular appeal and is one way to attack the problem. However, in the opinion of the writer, it will be most unfortunate if the decline in the census of tuberculosis hospitals is used as a lever to close these institutions. The problem of tuberculosis is by no means near solution.

In the past a feature of great concern was the possibility of relapse of the disease subsequent to a return of clinical well-being of a tuberculous person. If chemotherapy "cures" the disease, there should be no relapses. That relapses do occur subsequent to the withdrawal of chemotherapy is now well recognized. This fact should engender an attitude of caution concerning the ultimate effect of chemotherapy in this disease.

Chemotherapy also has served another purpose: it has given the pathologist the opportunity to demonstrate certain aspects of the pathology of tuberculosis through the study of resected pulmonary tissue. From such studies it has become possible to emphasize that there is a wide variation in the relative proportion of the non-necrotic and the necrotic components of the disease and also that there is a considerable variation in the amount of residual parenchymal scarring after healing of the non-necrotic component occurs. Moreover, it has become possible to emphasize that there is a considerable variation in the behavior of necrotic lesions in different patients and even of individual lesions in the same patient. All of these features indicate the lack of uniformity in the pathologic process and suggest that the tuberculous patient be considered on an individual rather than on a group basis. The greatest difficulty is that the crudity of present methods does not permit the behavior of residual necrotic lesions to be determined at the time clinical health has been regained. However, this difficulty is not new. This feature has always made the behavior of pulmonary tuberculosis unpredictable.

Chemotherapy has brought to light unsuspected potentialities of the tubercle bacillus. The ability of this organism to accommodate itself to the presence of all known effective chemotherapeutic agents greatly complicates the management of the tuberculous patient. It is natural that the clinician would burden the laboratory with examinations aimed directly at the clinical problem. Despite sympathy with this practice, the writer is convinced that a solution of the problem requires a probing into much more fundamental questions, the answers to which can

have no immediate application to the treatment of sick persons. It would seem to be the duty of the clinician to foster vigorously fundamental research in bacteriology. An essential part of this research should be a study of tubercle bacilli obtained directly from tuberculous lesions of various ages. Such a study might well be undertaken with an attitude of healthy dissatisfaction with accepted bacteriologic procedures.

The writer was an early advocate of performing resection surgery during a course of effective chemotherapy. It is recognized that open chest surgery is always a major surgical procedure and that it is not devoid of some risk to the patient. It is also apparent that surgeons will be required to reorient their concepts of the pathologic problem with which they are dealing.

The writer will list briefly the reasons for favoring surgical resections of residual tuberculous disease.

The evidence from necropsy studies is convincing that progressive tuberculosis is frequently not a generalized infection; that pulmonary lymph node tuberculosis in adults usually is an unimportant feature; and that often the pulmonary disease is limited to a relatively small area of lung tissue. Moreover, the evidence is likewise convincing that resection of the pulmonary disease offers, at this time, the best chance of eradicating the dangerous residual pathology.

Chemotherapy cannot help but alter the nature of the bacterial population. If a relapse should occur after chemotherapy is discontinued, further treatment of the patient will be complicated by the altered bacteriologic problem.

Finally, there is no more effective way to demonstrate the dynamics of the pathologic process than to show clinicians and surgeons the condition, present after many months of chemotherapy, in tissues removed from tuberculous patients who continue to be a problem. There is also no better way to demonstrate that chest roentgenograms, essential as they are, often do not accurately show either the extent or the nature of the disease process.

One of the problems which has arisen as a result of resectional surgery is the question whether the condition found in some patients warrants a major surgical procedure. In this situation, usually the argument revolves about the small number and the small size of the necrotic foci which have been found. It is not possible to take a dogmatic stand on this issue because there is no way of knowing how an individual necrotic lesion, regardless of size, may behave. This is not in any way dodging the issue; rather it is a frank admission of an inability to prognosticate the behavior of necrotic lesions. It is not the *size* but rather the subsequent *behavior* of a necrotic lesion which is the issue. It must constantly be borne in mind that progressive pulmonary tuberculosis is usually initiated by a necrotic lesion which is too small

to be recognized roentgenographically. It can be stated as a general proposition that small necrotic lesions, that is, those 2 to 3 mm. in diameter, have a greater tendency to liquefy and slough if they are located in the superior and posterior portions of pulmonary lobes than do similar lesions in the lower portion of lobes.

In this connection, it is not infrequent that more disease is found by the surgeon than was anticipated from roentgenographic findings prior to surgery. Moreover, in some patients the disease is found to be so widely scattered, that, from a pulmonary functional standpoint, it would seem best not to attempt excision of all disease.

The great variations in the amount and distribution of residual necrotic disease which may be found at surgery after a considerable course of chemotherapy are features to be expected because of the pathologic nature of the disease. These variables probably represent the most difficult problem in the management of a tuberculous patient. Unavoidably, the decision for or against surgery in any patient is the prerogative of the clinician, and here features other than the actual pathologic process may be the deciding factors. Decisions at operation rest entirely in the hands of the surgeon, who should understand the potentials of the disease under his fingers. In neither of these situations should the pathologist be either expected or permitted to make a final decision, since he is not in a position to accept responsibility of caring for the patient.

Time alone will demonstrate the effectiveness of open chest surgery in tuberculosis. However, it should be given a thorough, intelligent, and fair trial. In this respect, it must be realized that the hazard of acquiring a new infection is a possibility that, as yet, is beyond prediction. Tuberculosis, because of the nature of the pathologic process, remains a disease which requires a long period of post-treatment observation before any form of management can be evaluated.

In closing, the writer wishes to return to a consideration of the unanswered fundamental problems in tuberculosis. These can be stated best by a series of questions. What is the nature of the chemical process that induces necrosis? It does not seem to be related directly to substances generated by the infectious agent. Why do some necrotic lesions undergo liquefaction and slough fairly promptly, while others do so only after a considerable delay, and still others never do? Again the process does not seem to be related directly to the infectious agent. May it not be possible either to induce a clean and prompt slough of all necrotic debris under controlled conditions or to prevent liquefaction com-

pletely? Why are tubercle bacilli able to survive and to multiply, sometimes in tremendous numbers, in tissue which was sacrificed to destroy them? Why, in many instances, have these bacilli lost their ability to grow on culture media now in current use and to produce progressive disease in experimental animals? Are these masses of bacilli dead or have their life processes become so altered that accepted laboratory techniques are inadequate to determine their status? Why are some portions of the lung parenchyma more "vulnerable" than others to the implantation of a few tubercle bacilli? It will be necessary to obtain answers to at least some of these questions before one may talk, with sense, about the eradication of tuberculosis.

Investigations directed toward the solution of these questions belong to the field of fundamental rather than applied research. They cannot be expected to have an immediate application to the care of the tuberculous patient or to the formulation of public health programs. However, the knowledge accumulated through such studies would undoubtedly cause a considerable revision in the present methods of procedure.

All of the questions proposed above are rather closely inter-related and preferably should be considered as a unit. The services of the chemist, bacteriologist, and pathologist will be required in the actual investigation, and, if materials from human sources are to be used, the close cooperation of the clinician and the surgeon will be essential. The investigations should be assured of long-range financial support. In the writer's opinion, they should be carried out either in, or in close association with, a tuberculosis hospital, for it has been his experience that one must live intimately with the problem of tuberculosis to gain an appreciation of the inherent difficulties and complexities it presents and to develop a dogged determination to stick with the problem until its solution is assured.

Without doubt, answers to the questions raised will be most difficult to obtain, and asking for a solution may seem to be a large order. It must be admitted, however, that the problem of tuberculosis is still immense and, because of this, one might be inclined to be fatalistic about the disease. The writer does not subscribe at all to this attitude. Rather, here is a challenge to complete a task that already has consumed large amounts of human energy and resources. It would be quite unfortunate if no more than a truce could be negotiated with this microscopic, parasitic, vegetable cell. Under these conditions, eternal vigilance would be required lest the uneasy truce be broken.

Cardiac Surgery

A Brief Review

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DURING less than twenty years, cardiac surgery has become an important field of operation. Already this field boasts several excellent operations and new operations appear frequently, for a large number of young and imaginative investigators throughout the world are engaged in the field. The trend of this investigation will be touched upon, but this paper is primarily a brief description of operations which may be useful at the present time.

Most of the successful cardiac operations are for defects that appear, anatomically, relatively simple to repair. The basic surgical plan is easy to understand. For example, nothing in surgery is more simple in concept than division of a patent ductus arteriosus. Comparable operations are resection of an aortic coarctation or closure of an atrial septal defect; in each case, an abnormal channel or aperture is closed or an obstruction relieved. The common aim of curative operations is to restore the anatomy to normal. On the other hand, some highly beneficial, if not curative, operations do not fit this plan. The Blalock-Taussig¹ operation for the tetralogy of Fallot, as a good example, achieves great functional improvement by altering the physiology of the circulation without correcting the pathologic anatomy.

Whether the actual cardiac operation is fundamentally simple or not, the technical problem of reaching and exposing the defect has been formidable. The first step—operating within the open chest—was attained only after a long struggle, but after the chest could be opened, the heart remained as the least accessible of all the organs exposed. The blood pumping through the heart at an enormous rate threatened to rush out at the same appalling rate if the large vessels were torn during manipulation. Furthermore, the precarious rhythm of its beat seemed apt to break down in ventricular fibrillation or stop altogether under the stimulus of a direct opera-

tion. In time these threats became less awesome. Techniques were developed for managing the large vessels with small risk of hemorrhage, and the heart itself proved able to withstand a fair amount of direct trauma, if its function were improved by the surgery. In fact, the ill human heart appeared better able to bear direct surgery without falling into serious arrhythmias than did the dog heart, upon which most of the basic techniques were developed. Now the heart can be manipulated and probed with relative safety. Its chambers may be opened widely to repair internal defects while the circulation is interrupted or bypassed.

The body of this paper is organized along anatomic rather than etiologic lines. It starts with the extracardiac lesions, which were the earliest lesions to be treated surgically, and continues with the valvular defects, then the septal defects, and ends with a small section on coronary insufficiency.

EXTRACARDIAC ANOMALIES

Patent ductus arteriosus. Surgery as a practical treatment for congenital cardiovascular anomalies began with the first successful operation on this anomaly by Gross and Hubbard² in 1938. Since that time the patent ductus has been divided with good results by many surgeons. Surgery was quickly accepted as a preferred treatment for this disease and the operation is still the most nearly ideal in cardiac surgery, and perhaps in general surgery too. The risk is low, trauma to normal tissues is minimal, the operation is curative rather than palliative, and its benefits are lasting.

In skilled hands, the correct diagnosis can be made in over 90 per cent of cases without special technics. In infants, however, special methods such as cardiac catheterization or retrograde aortography may be required, for the typical continuous murmur is usually absent in these patients.

With but few exceptions, surgery should be

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recommended for every individual in whom the diagnosis is made. The need for surgery is clear when the disease has caused heart failure or when bacterial endocarditis has supervened. But, even if the condition is asymptomatic, surgery is advocated to forestall the trouble that is certain to develop eventually.

The best age at which to perform the operation is between 3 and 6. Surgical division is technically simple at this time, and the child then starts school with the advantages of a normal heart. If done at this age, in asymptomatic children, the mortality rate of the operation should be less than 0.5 per cent. In some cases, if the disease causes heart failure, the operation may have to be performed earlier or even in infancy. The operation may be done with relative safety even in older adults, provided, of course, that the blood still shunts left to right from the aorta to the pulmonary artery. If the shunt is predominantly right to left, the condition is inoperable at any age. This unfortunate state occurs because of pulmonary hypertension and may be a feature of a complex anatomic abnormality in which the patent ductus enters the aorta just below a coarctation. Then the crucial physical finding is a cyanosis of the feet combined with hands of normal color.

Technically the operation calls for division of a short fragile vessel which joins the two largest arteries of the body deep within the chest (figure 1). To ease the weight of this task, ligation has been substituted for actual division, but this procedure does carry some danger of recurrence. Division is better and can probably be done with no greater risk. The incision is placed posterolaterally or anterolaterally in the left chest.

Provided that a patent ductus is the only abnormality and that the division has been complete and successful, the results are uniformly good. The murmur disappears, the diastolic blood pressure rises, and the heart functions more efficiently. Underdeveloped children usually show a gain in weight and in vigor, and even those who were supposedly normal in development prior to surgery may become more active after the operation.

Coarctation of the aorta. For this lesion as for the patent ductus arteriosus, surgery is advocated in most instances after diagnosis has been made. The operation is more difficult, however, so the risk is a little greater. Furthermore, the pathologic physiology is more complicated, and for this reason, the ultimate results are not quite as good as those achieved with the patent ductus arteriosus.

The pathologic anatomy varies some, but the

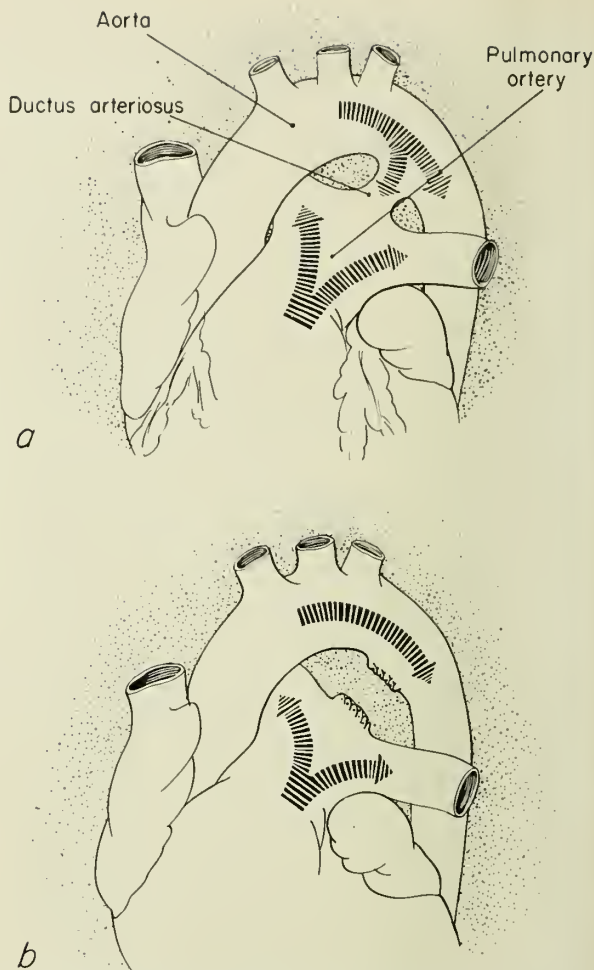


Fig. 1. Division of the patent ductus arteriosus. (a). Open ductus is shown shunting blood from the aorta to the pulmonary artery. (b). Ductus has been divided and ends closed with continuous silk stitches.

usual coarctation is an almost complete mechanical block of aorta just beyond the left subclavian artery and near the ligamentum arteriosum (figure 2a). The lumen at this point is reduced to an opening about 2 mm. in diameter by an asymmetrical diaphragm.

The hypertension of the upper part of the body which characterizes the deformity may actually be secondary to a renal ischemia rather than the result of a simple obstructive mechanism. In any case, this hypertension disappears in about 90 per cent of patients after the obstruction has been relieved surgically.

Occasionally the disease may cause heart failure in infancy, but more frequently symptoms do not occur until the second or third decade. After symptoms appear, the prognosis is poor without surgery. Although some individuals lived a full span, the average age at death without surgery was 35. The common causes of death

were bacterial endocarditis, rupture of the aorta, heart failure, or cerebrovascular accidents.

Generally the diagnosis can be made without elaborate equipment, for it depends principally on the finding of a significant blood pressure differential between the arms and the legs. After the first decade, hypertension of the upper half of the body is the rule.

Although surgery is usually indicated after diagnosis has been made, age or complications may modify the strength of the indication. The best time of life for the operation is between the ages of 10 and 20, but the operation is not contraindicated in older individuals. The aorta of older patients may still be surprisingly soft and pliable. Surgeons prefer to avoid an operation before the age of 10 because an anastomosis made in a small child may never grow to adult dimensions. However, some children, usually under 1 year of age, may succumb to the condi-

tion if surgery is delayed. In infancy, the risk of surgery is high, often because of associated anomalies, so it becomes a trying problem to decide when an operation should be performed on these patients. Among older children and adults, it may occasionally be difficult to decide when associated cardiac anomalies contraindicate an operation. An associated patent ductus is not a contraindication unless pulmonary hypertension with a right to left shunt is present, such as may occur when the patent ductus enters the aorta below the coarctation. Aortic insufficiency or mitral valve disease should probably not stop the physician from advising repair of a coarctation, although opinions differ on this point.

At surgery the constricted portion of the aorta is resected and the ends anastomosed to form a normal lumen (figure 2*b*). The anastomosis is made with a continuous, over-and-over or an everting stitch of fine silk while the aorta is clamped above and below. In every case, the dilated intercostal arteries just below the coarctation provide a hazard and occasionally other dangers and complications are encountered. For example, the ends of the aorta may be difficult to bring together if a relatively long segment were resected. For this situation and for the rare cases in which an aneurysm occurs below the coarctation, some surgeons have employed homografts. These grafts are rarely needed.

The blood pressure drops to normal within two or three weeks after surgery and convalescence is ordinarily untroubled. We have, however, noted a syndrome of troublesome and persistent abdominal pain postoperatively in about one-third of our patients.³ This syndrome led to a laparotomy in 4 patients, and intestinal gangrene with a pathologic picture of periarteritis nodosa was found in 2. This clinical picture of abdominal pain is doubtless secondary, in some way, to the profound changes in circulatory dynamics within the visceral arteries which follow correction of the defect.

Vascular ring. Several vascular anomalies of the aortic arch and its major branches may come to clinical attention if they cause partial obstruction of the trachea, the esophagus, or both. The clinical picture is rare but worthy of mention, because, if recognized, disaster may be averted by an operation. A partial or complete vascular encirclement of the trachea and the esophagus produces the symptoms. With the double aortic arch, for example, illustrated in figure 3, both the trachea and esophagus are constricted, but the prominent symptoms are due to the tracheal obstruction. On the other hand, an aberrant subclavian artery characteristically produces diffi-

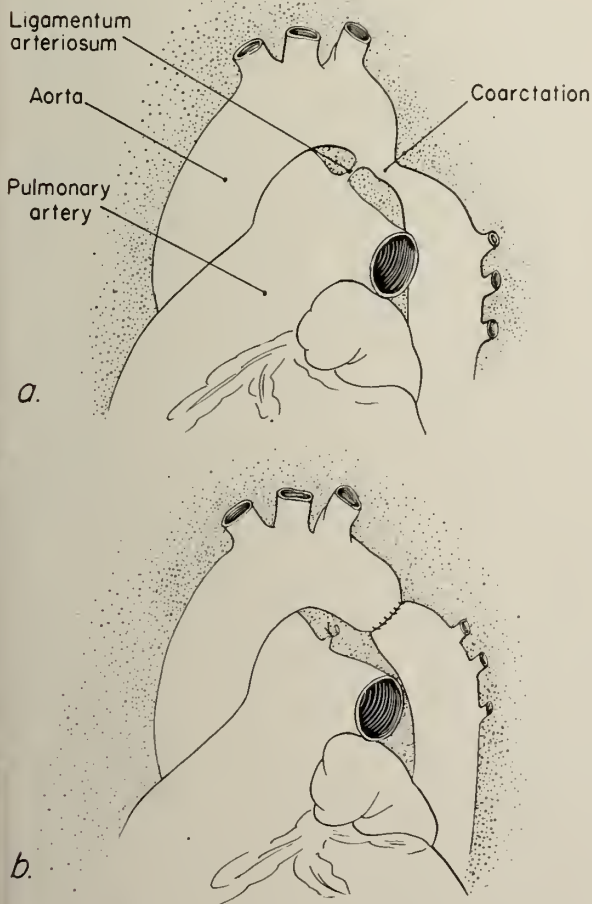


Fig. 2. Coarctation of the aorta. (a). In this case, the coarctation is located distal to the ligamentum arteriosum. Surface appearance does not reflect extreme degree of internal narrowing which actually exists. (b). Coarctation has been resected and ends anastomosed with fine silk.

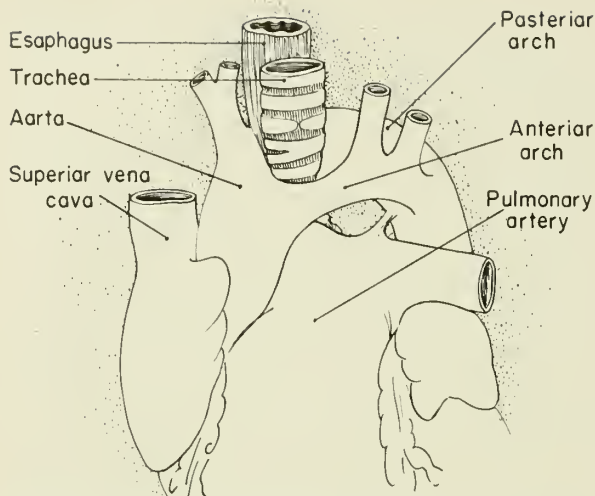


Fig. 3. Double aortic arch forming a vascular ring around the trachea and esophagus. Anterior arch is smaller than the posterior in this instance and will be divided to relieve the obstruction.

culty in swallowing, and the clinical syndrome associated with this condition has long been known as dysphagia lusoria. The other less common aortic arch anomalies tend, like the double aortic arch, to cause respiratory difficulties rather than dysphagia.

If these anomalies produce serious respiratory difficulty, they usually do so in infancy. The child may have a rapid respiratory rate with a prominent inspiratory and expiratory stridor, and respiratory infections may be frequent. Gross describes a tendency in these infants to hold the head in hyperextension.⁴ Roentgenographic examinations, including perhaps an esophagram and a tracheogram, establish the diagnosis.

Surgery is indicated only if the anomaly causes symptoms, and, in such cases, an operation should be recommended even in infancy. The proper vascular channel or ligament is divided to release the trachea and esophagus. For example, a surgeon encountering the anomaly shown in figure 3 would probably divide the anterior aortic arch between the left carotid artery and the subclavian artery. The results after surgery are good but improvement may come slowly, especially if the trachea has been severely compressed for some time.

DISEASES OF THE VALVES

Isolated pulmonary stenosis. An obstruction of the right ventricular outflow in one form or another is a common congenital cardiac anomaly. It forms part of the tetralogy of Fallot and, in an extreme degree, is the main lesion of tricuspid atresia. It may also exist alone as the only important cardiac abnormality. This latter type, which has been referred to as "pure" or "isolated"

pulmonary stenosis, is often remediable surgically. Right ventricular outflow obstruction takes the form of a valvular stenosis or of an infundibular narrowing by fibrous tissue and muscle. The pathologic pattern is complex in a number of ways, but there are a few general rules. The stenosis in the isolated form is usually valvular, while it is infundibular if an associated ventricular septal defect is present, although there may be a valvular stenosis in addition. In cases with an associated ventricular septal defect, the typical clinical picture of the tetralogy of Fallot may or may not be found depending, probably, upon the degree of pulmonary obstruction and the degree to which the aorta overrides the defect. Tetralogy of Fallot will be discussed after the section on ventricular septal defects.

With isolated pulmonary stenosis, the child is acyanotic unless an associated atrial septal defect is present. There is a systolic murmur and thrill over the pulmonary area, and the right ventricle is enlarged. The pulmonary trunk is large, but the peripheral lung fields are relatively avascular. In time, the right heart fails.

The degree and character of the pressure change between the pulmonary artery and right ventricle measured at cardiac catheterization not only establishes the diagnosis of stenosis but may also indicate whether the stenosis is valvular or infundibular. Associate left to right shunts may be detected during catheterization. The height of the right ventricular pressure determined at catheterization is also important, for surgery is not recommended in isolated stenosis unless the right ventricular pressure exceeds 75 mm. of mercury.

The operation devised by Sellors⁵ and Brock⁶ utilizes blind instrumental cutting and dilatation of the pulmonary valve through a small right ventriculotomy. The mortality rate has been low and the clinical results have been good, but the right ventricular pressure, determined by post-operative measurements, has not often fallen to normal. Because of this fact, Swan and associates maintain that the stenosis is not adequately relieved by the Brock operation and they propose an open attack on the valve.⁷ Under hypothermia and total cardiac inflow occlusion, they open the pulmonary valve widely and cut the valve under direct vision (figure 4). The risk is probably no greater with this open operation and afterward the right ventricular pressure drops to normal in most instances. I prefer this operation to the blind procedure.

When an atrial septal defect is present in addition to the pulmonary stenosis, relief of the stenosis is usually sufficient. In these cases, the

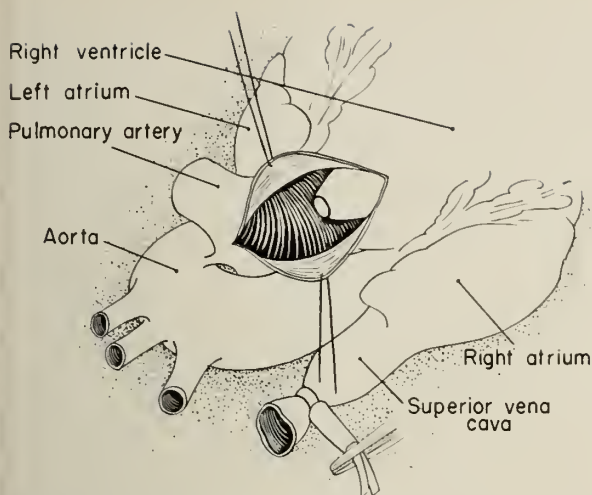


Fig. 4. Open operation for valvular pulmonary stenosis. After occluding the cardiac inflow, the pulmonary artery is opened to expose the funnel-like, stenosed valve. This is then opened with a scissors.

atrial septal defect may exist functionally but close when the right heart pressure falls after the valvulotomy. Nonetheless, a separate repair of the atrial septal defect will probably be needed in some cases.

Mitral valve. Though sporadic attempts were made much earlier, not until 1948 with the work of Bailey⁸ and Harken and associates⁹ did surgery for mitral stenosis become a practical therapy. Understandable, indeed, was the hesitancy of more timid surgeons prior to this time. For several reasons, this lesion did not look suitable to operate upon. The rheumatic mitral valve is thick and often calcified so that one could not hope to restore it to normal. Insufficiency, more serious than the original stenosis, might result from surgical intervention. At best, an operation could only be palliative. It is a triumph indeed that in spite of these discouraging considerations, surgery has proved effective for many patients with mitral stenosis.

By the time mitral stenosis became evident clinically, valve cusp fusion had advanced far enough to reduce the orifice to an opening only about 1 cm. in diameter. The orifice does not constrict much further than this, although, of course, the disease progresses clinically. At the sight where the valve cusps fuse, two ridges called the commissures appear. The chordae tendinae thicken and adhere to one another, the valve cusp itself grows heavy, and calcium deposits may appear. The valvular obstruction produces increased pressure in the left atrium and pulmonary vessels which, in turn, cause enlargement of the left atrium and the right ventricle.

Patients with the disease are classified accord-

ing to the severity of their symptoms. Class I patients are asymptomatic. Class II patients have some disability because of exertional dyspnea and unusual fatigue. Class III patients have usually had one or more episodes of congestive heart failure, while class IV patients are bedridden because of chronic congestive failure.

Indications for surgery are the subject of some dispute, but most authorities agree that class II and III patients with "pure" stenosis should have an operation. In addition, a history of embolic episodes provides an excellent indication for surgery even though the patient is otherwise a class I patient. In fact, some surgeons favor an operation for most relatively young class I patients, pointing out that the disease is progressive and that severe valvular deformity may exist even in an asymptomatic patient. At the other end of the scale, some class IV patients should be operated upon even though the risk is high. Indeed, some of the most dramatic successes have been obtained in this group. To a degree, age modifies the indications for surgery. Patients under the age of 10 are almost never candidates for mitral valve surgery and rarely those under 20. On the other hand, an operation may be indicated for some patients over 60 if considerations other than age are favorable. The author obtained a gratifying result in a patient 64 years old. Surgery should be deferred at any age if there is evidence of rheumatic activity or subacute bacterial endocarditis.

At surgery, the surgeon enlarges the mitral orifice by separating the valve cusps at the commissures. This is done by inserting the index finger into the left atrium through the auricular appendage (figure 5). If the finger alone is not

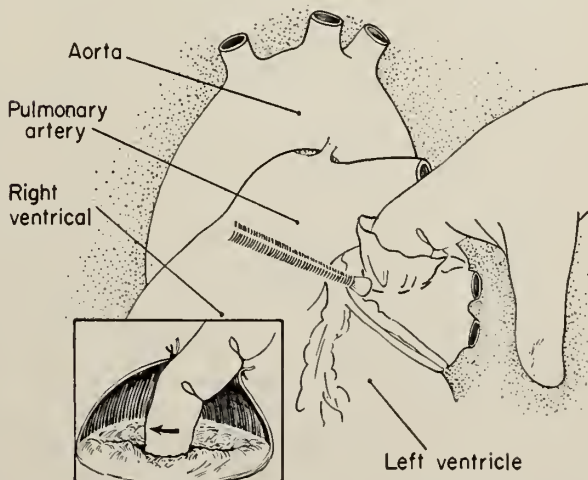


Fig. 5. Mitral commissurotomy. Surgeon works with his finger in the left atrium through the auricular appendage. It may be possible to open the valve with the finger alone (see insert) but, if not, special knives are used.

successful, special knives are passed in with the finger and the commissures are then divided by a combination of cutting the pressure. The anterior commissure is usually divided out to the heart wall if this can be done without producing a significant regurgitation.

In spite of the fact that many patients subjected to this operation are poor operative risks, the results have been quite good. The operative mortality rate is about 10 per cent. In various reported series, from 60 to 90 per cent of the patients improve clinically after surgery. Though physiologic measurements by cardiac catheterization do not show results quite as satisfactory, they indicate improvement too. Since the operation is still new, not many patients have been observed for more than a few years after surgery, but as yet recurrent stenosis has rarely appeared. This complication will doubtless occur more often as the years pass, but the possibility of recurrence should not dissuade the physician from advising a commissurotomy. A second operation can be performed if stenosis recurs.

Surgery is not yet practical if the predominant mitral lesion is regurgitation rather than stenosis. A great variety of operative technics have been advocated, but most of them were soon abandoned even by their originators. We have found that an operation on the mitral valve under direct vision is possible in experimental animals, but a useful operation has not yet followed this discovery. Currently, operations that produce a constriction of the mitral valve annulus seem to hold promise, but possibly none will be satisfactory until an operation can replace the diseased valve with a living homograft.

As long as surgery for mitral insufficiency is only experimental, it is important preoperatively to separate patients with this disease from those with stenosis. Unfortunately, this is still a puzzling diagnostic problem not resolved by the usual methods of physical diagnosis or even right heart catheterization. Left heart catheterization through a dorsal left atrial puncture may prove to be a better method.

Aortic valve. This valve has proved less amenable to surgical treatment than either the pulmonary or mitral valve. In a position of difficult access anatomically, the approach is also difficult physiologically, for it separates two high pressure areas. The penalty for creating an insufficiency while attempting to correct a stenosis is much greater with the aortic than with either the mitral or pulmonary valve. Furthermore, the pathologic nature of aortic valve disease presents a formidable obstacle to surgical repair. It sometimes seems as if little can be done to

restore a heavily calcified and deformed valve to anything resembling normal function. A completely satisfactory operation may demand a better artificial valve than any now available or else a viable homograft. Lacking these methods, however, surgery may still benefit some individuals if their diseased valve can be opened carefully along the line of the fused valve cusps.

Disease of the aortic valve may be congenital, rheumatic, or atherosclerotic, but differentiation of the type may be impossible especially if the deformity has progressed to calcification. Congenital, subaortic stenosis may be distinguished from a valvular stenosis at autopsy, but differentiation on clinical grounds may be impossible. In any case, subaortic stenosis is rare.

In contrast to mitral stenosis, aortic stenosis tends to produce a rapid downhill course after symptoms develop. A patient may have the characteristic murmur with evidence of left ventricular hypertrophy for years and still be active, but the disease advances rapidly when symptoms finally do appear. The best time to perform an operation is probably shortly after symptoms first appear.

The best-known operations for aortic stenosis are those which employ blind transventricular or transaortic approaches to the valve. Bailey¹⁰ advocated a transventricular approach at first and developed an ingenious instrument to reach the aortic valve and dilate it forceably. This operation was tried by a number of surgeons but the risk was high and results were not satisfactory. More recently the blind transaortic approach has gained support. During this operation the valve can be palpated with a finger and then opened with the finger alone or with a special knife and a dilator. This promises to be superior to the transventricular operation.

The advantages of operating under direct vision in other parts of the heart suggest that an open operation might also prove best for aortic stenosis. Certainly with the older transventricular blind technic all three commissures of the aortic valve were never opened. Usually only one commissure was split with the dilator, although an additional tear in the valve cusp was not uncommon. To devise an open operation, we worked out technics for exposing the aortic valve in dogs during hypothermia and temporary cardiac inflow occlusion. The method is similar to that used by Swan⁷ for direct vision operations on the pulmonary valve. Recently I employed an open operation to relieve aortic stenosis in a bed-ridden 12-year-old girl (figure 6). The result in this case was highly gratifying and further trial of the method is planned. Since

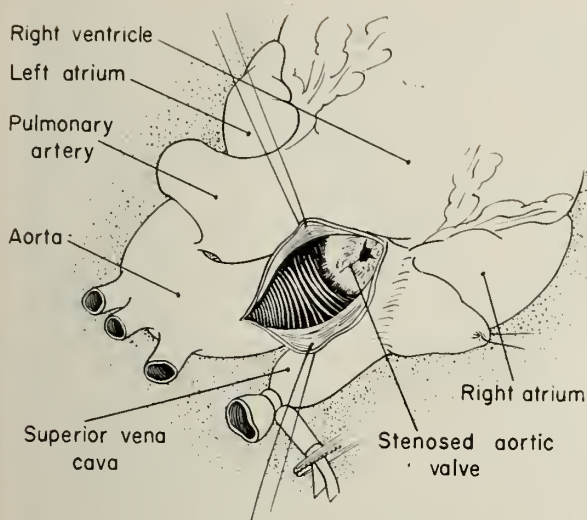


Fig. 6. Open operation for aortic stenosis. Cardiac inflow is occluded and the aorta opened to expose the stenosed valve. The three fused commissures are then cut under direct vision.

this allows an accurate and complete opening of the valve at the commissures, it may yet prove to be a significant advance over blind technics.

In the case of the aortic valve, as with the mitral, insufficiency provides an even more difficult surgical problem than stenosis. A number of imaginative, experimental operations have been devised, probably the most notable of which is Hufnagel's.¹¹ He used a plastic ball-valve inserted into the descending aorta. But this operation, which he has employed successfully in man, has not yet been received enthusiastically by other cardiac surgeons. Although no better operation is available at present, a better procedure is badly needed.

SEPTAL DEFECTS

Atrial septal defects. Surgery has advanced to the point where it can be confidently advocated for most individuals with this defect. The risk is generally low and the results are good. Perhaps an atrial septal defect can never be repaired with the small risk attendant to division of a patent ductus arteriosus but, when closure is successful, the cure is as complete. In contrast to most valvular surgery, operations on this defect are curative rather than palliative.

Although often quite complex anatomically, atrial septal defects fall into three main types: foramen ovale defects, high defects, and low defects.¹² A fourth group may be added to cover large defects exhibiting characteristics of both foramen ovale and high defects. Foramen ovale defects occur most frequently and are the easiest to repair. High defects, the second major type,

lie adjacent to the orifice of the superior vena cava and are invariably associated with partial anomalous pulmonary venous drainage. Although repair is sometimes difficult, they can all be corrected. Defects located just above the tricuspid and mitral valves — the low defects — represent, to some degree, a persistent atrioventricular canal. The most severe type of low defect, sometimes called an incomplete double heart, seems to be irreparable at present. Fortunately, this condition is rare.

With any type of defect, an associated mitral stenosis may be present to produce the complex known as Lutembacher's syndrome. In our series, mitral disease was found 5 times in 44 patients. The degree of the stenosis is never as severe as that found in a pure mitral stenosis.

Functionally the defect allows a large vascular shunt from the left to the right atrium which may actually amount to 3 or 4 times the systemic blood flow. This puts a great load on the right heart and causes enlargement of the right atrium, the right ventricle, and the pulmonary artery. In time, right heart failure develops. As long as the pulmonary resistance remains low, the shunt is from left to right and the patient is acyanotic. Terminally, however, the right heart pressure may rise high enough to cause a right to left shunt and cyanosis. This condition is uncommon in our experience and found only in older adults.

Clinical and roentgenologic evidence may be sufficient to allow a diagnosis in many cases, but surgery cannot be undertaken without the confirmatory evidence obtained at right heart catheterization. Catheterization establishes the presence of an atrial septal defect with a high degree of accuracy, though it does not identify the exact anatomic type or condition of the mitral valve.

The natural history of the disease is quite variable. Death occurs rarely in childhood while, at the other extreme, some individuals with the disease enjoy a normal life span. Most cases during childhood are asymptomatic, mild symptoms appear during adolescence, and death finally occurs in the fourth or fifth decade. Surgery is probably indicated when symptoms begin to appear. The disease can be cured surgically in older adults — our oldest patient treated successfully was 61 — but the risk is greater and, therefore, an operation during the teens or twenties is best. If cyanosis has developed, the disease is inoperable.

Surgeons have employed several blind operations during which the defect is repaired with one finger in the atrium to guide the stitches or through a pool of blood rising in a special "well."

We have not tried these methods but use instead an open operation allowing repair of the defect under direct vision while the cardiac inflow is interrupted¹³ (figure 7). The body temperature is lowered to about 82° F. in order to reduce the oxygen requirements and thus allow an adequate period of circulatory interruption without ill effect. For more complex defects, especially, and perhaps for all defects, an open operation provides a more certain method of repair than does a blind technic.

Isolated ventricular septal defects. Surgery should prove as effective for many patients with this defect as it has for individuals with a patent ductus or an atrial septal defect. In all three anomalies, the major functional abnormality is a left to right shunt, and if the shunt can be interrupted, cardiac function should return to normal. Unfortunately, a number of anatomic and physiologic problems associated with ventricular

septal defects make this simple objective difficult to achieve. Surgery has made important advances but not quite to the point where an operation can be advocated for the majority of patients with the anomaly.

The anatomic features which make a ventricular septal defect difficult to repair are identifiable in figure 8. Located in the region of the membranous septum, the defect is partially hidden by the tricuspid valve immediately adjacent to the aortic valve and near the mitral valve. The main bundle of the conduction system passes through the crest of the septum as it bounds the defect. These relationships are the same, in most cases, whether the defect is an isolated anomaly or associated with other cardiac anomalies.

The functional behavior of the defect depends upon its size and position in relation to the aorta, but perhaps even more important in determining the functional dynamics is the level of the pul-

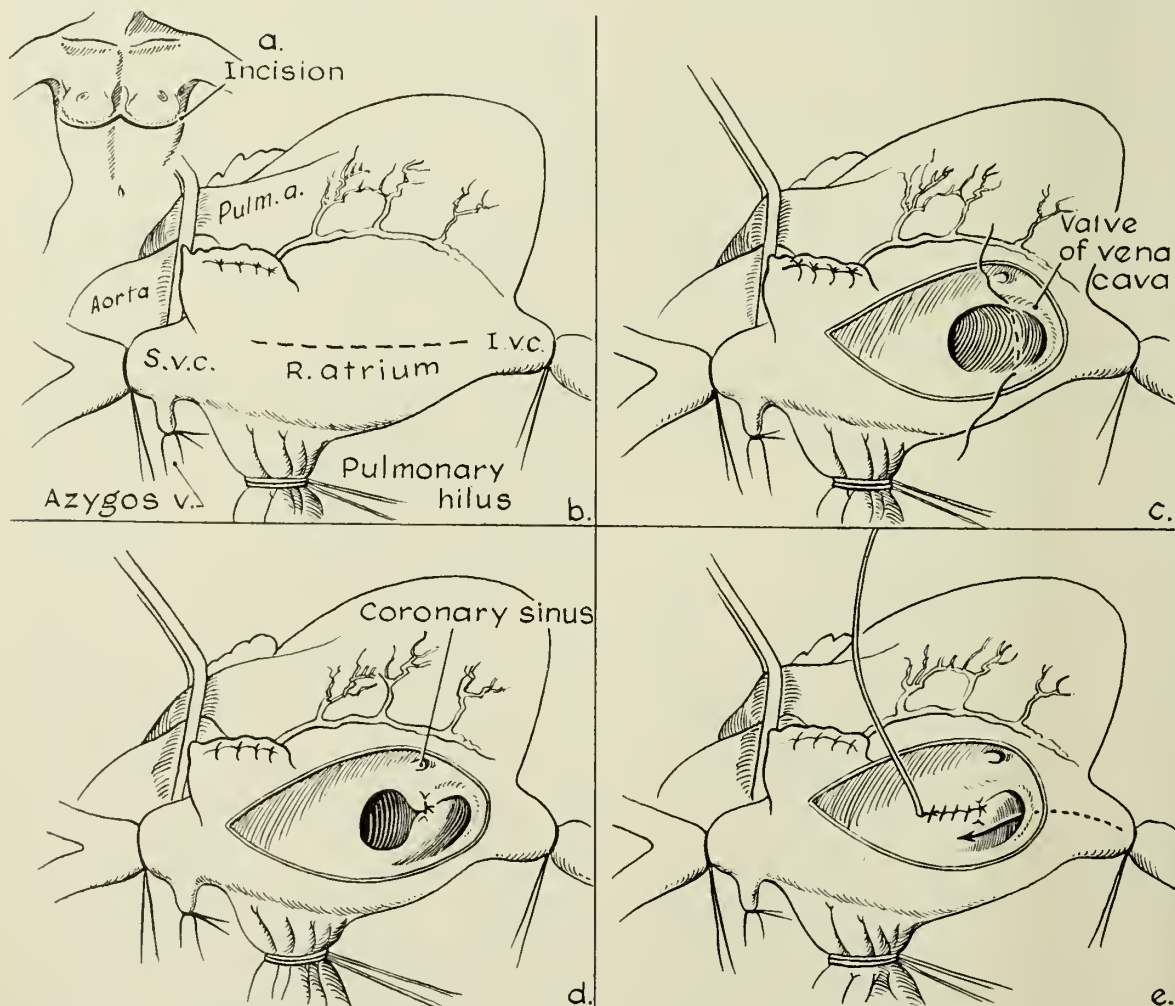


Fig. 7. (By permission of *Surgery*, 36:538, 1954). Repair of an atrial septal defect. (a). Transverse chest incision through which sternum is transected and both pleural spaces entered. (b). Circulatory inflow and outflow have been occluded and atrium is ready to be opened. (c). A foramen ovale defect is exposed and first repair stitch has been placed. (d). First repair stitch has been tied. (e). Repair has been completed, but the small tube used to fill the left heart with saline is still in place.



Fig. 8. (By permission of *Surg., Gynec. & Obst.*, 100:583, 1955). (a). Ventricular septal defect viewed from the right. It is just beneath the septal leaflet of the tricuspid valve. (b). Same defect from the left. It is below the aortic valve and adjacent to the mitral valve as well.

monary vascular resistance. When the pulmonary resistance and, hence, the right ventricular pressure remain low, the left to right shunt is large but as the pulmonary resistance increases, the shunt becomes smaller. If the right ventricular pressure finally equals or exceeds that of the left ventricle, some venous blood shunts from right to left and the patient becomes cyanotic. This reversal of the shunt may never occur in some cases, but it occurs quite early in others. Possibly a shunt reversal, secondary to increased pulmonary vascular resistance, will occur in most patients with a ventricular septal defect if they live long enough. When cyanosis becomes evident, the clinical picture is that of Eisenmenger's complex. At this stage, a surgical closure of the defect can no longer be considered. Closure of a reversed shunt, whether through a ductus, an atrial septal defect, or a ventricular septal defect, puts an intolerable burden on the right heart. In fact, a high right ventricular pressure with any of these three defects, even though the pressure has not quite reached systemic levels, significantly increases the risk of an operation.

Diagnosis of a ventricular septal defect is suggested by clinical and roentgenographic signs but only established by cardiac catheterization. Prognosis is variable but distinctly poorer as a rule than the prognosis associated with an atrial

septal defect or a patent ductus arteriosus. Subacute bacterial endocarditis or heart failure has been the usual cause of death.

Blind operations have been devised for repairing ventricular septal defects, but these procedures cannot offer the promise of an open procedure. The defects are not large in size, but their complex anatomy requires the careful repair that is only possible under direct vision. Clinical as well as experimental efforts to repair these defects are progressing in a number of centers. An artificial pump oxygenator to bypass the heart during the repair offers great promise,¹⁴ although, experimentally at least, hypothermia with the technic employed for atrial septal defects has worked satisfactorily. With this defect, the detailed technical problems of repair may be more important than the method used to allow exposure of the defect.

Tetralogy of Fallot. This anomaly has been treated, and quite well too, by operations that actually palliate rather than cure the disease. The Blalock-Taussig operation¹ and the similar operation designed by Potts¹⁵ stand out as great advances in therapy. Later, to attack the disease more directly, Brock⁶ advocated a blind operation that relieved one feature of the anomaly—the pulmonary stenosis. Now, with open intracardiac surgery, it is possible to try to repair

the entire defect directly.¹⁶ Complete direct repair is a formidable task, however, and not yet a practical treatment. At present, the proper course of treatment to advise for a particular patient is a matter of opinion at best.

In this discussion, tetralogy of Fallot logically follows ventricular septal defects, for the anomaly is principally a ventricular septal defect complicated by a pulmonary stenosis. The other two elements that produce a "tetralogy," right ventricular hypertrophy and an over-riding aorta, are secondary in importance. Although, in some cases, the aorta may actually originate partially or wholly from the right ventricle, as a rule, the ventricular septal defect is similar anatomically to the isolated defect. The pulmonary obstruction is usually infundibular and occasionally a valvular obstruction is also present. In a more severe form, the condition is actually pulmonary atresia rather than pulmonary stenosis.

The cyanosis which is a characteristic feature of the disease results from two causes. First, the right ventricle, having a systolic blood pressure equal to that of the left ventricle, pumps venous blood through the defect and into the aorta. Second, the pulmonary blood flow is diminished because of pulmonary stenosis or atresia and, hence, an inadequate amount of blood is oxygenated by the lungs.

This second cause of cyanosis is the condition that is treated by a Blalock or Potts operation. By anastomosing a systemic artery—the subclavian artery or the aorta—to the pulmonary artery the blood flow through the lungs is greatly increased (figure 9). If this is accomplished suc-

cessfully, the cyanosis disappears or diminishes and life is lengthened in the majority of patients. Yet the original cardiac defects remain and an additional defect has been added. A direct operation designed to close the ventricular septal defect and relieve the pulmonary stenosis is theoretically much better but it still carries a high risk. For an individual who needs an operation at present, a systemic-pulmonary shunt is safest. This does not preclude use of a curative operation when one becomes safe and practical.

CORONARY ARTERY DISEASE

In spite of the fact that surgery does not, on first thought, appear suitable for coronary insufficiency, an intensive search for a useful operation has been made by a number of investigators. The methods devised are ingenious and are successful, to a degree, in dogs. They are reported to produce clinical improvement. Critical evaluation of these procedures is difficult and some of them may still prove beneficial, but, at present, evidence fails to show that these operations help patients with coronary insufficiency.

Operations to increase the blood supply to the heart are usually designed to create this effect in one or more of the following ways: by bringing blood in from an outside source with grafts of tissues or vessels, by increasing the intercoronary collateral circulation within the heart muscle itself, or by bringing arterial blood into the coronary sinus through grafts between it and the aorta. In canine experiments, only the second effect can be produced regularly and with some permanence, and this effect may be produced to some extent by any of the numerous operations devised. Thus, operations in which tissues are grafted to the heart probably allow subsequent ligation of the dog's coronary arteries because they have increased the intercoronary circulation and not because blood has been brought in from outside sources.

Unfortunately, valid inferences about human coronary circulation may not be possible from the results of canine experiments. This is particularly true if the main effect of surgery in dogs has been to increase intercoronary communications, for these communications are found much less often as potential channels in human hearts.

Of course, if the operation actually is successful clinically, as has been reported, no further proof is necessary. It must be pointed out, however, that vexing problems stand in the way of sound clinical evaluation. By the nature of the disease, surgery can only be palliative at best and not curative as, for example, is the case when a patent ductus is closed. Therefore, control

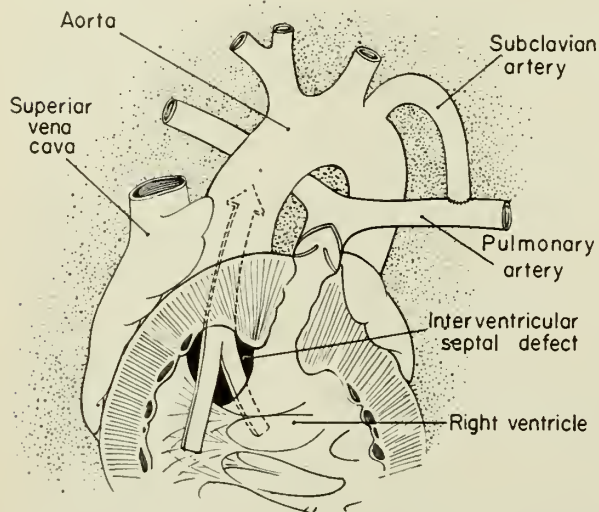


Fig. 9. Tetralogy of Fallot. There is an infundibular stenosis of the right ventricular outflow tract and the pulmonary artery appears small. A Blalock operation is illustrated showing anastomosis of the left subclavian artery to the left pulmonary artery.

studies are badly needed but probably impossible to carry out unless the control patients could receive the same psychologic benefits that are bestowed on the surgical patients. To further complicate evaluation, the precise extent of the disease being treated is unknown in any individual case. Clinical estimates of disability are notoriously inaccurate and electrocardiographs are not completely satisfactory.

DISCUSSION

Several diseases which respond well to surgery have been omitted. Such diseases as constrictive pericarditis and wounds of the heart are omitted because the author has had little experience with them. Others, such as total anomalous pulmonary venous drainage, triatrial heart, and aortic pulmonary defect, are omitted because of their rarity, although some cases can be cured surgically. Other congenital anomalies have been omitted from the discussion simply because no successful operations have yet been devised, although trials have been made. Examples of these diseases are transposition of the great vessels and tricuspid atresia. Surgery has not been attempted for other difficult congenital defects, such as the single ventricle or truncus arteriosus.

The small amount of attention paid to diagnosis in this report should not lead the reader to conclude that it is simple or unimportant. On the contrary, cardiac diagnosis is complex rather than simple, and an accurate diagnosis is often vitally important. Diagnostic methods are now so difficult that their study demands the full-time attention of specialists. Correct diagnosis before surgery is crucially important because many cardiac abnormalities are still inoperable. If, because of the wrong diagnosis, an ill cardiac patient is subjected to an unnecessary thoracotomy, the result may be fatal. Fortunately, in recent years, diagnostic skill has improved tremendously,

but a precise anatomic and functional diagnosis is not as yet always possible.

Predictions for the future of cardiac surgery must be made cautiously, but a note of optimism must not be overlooked. Even if no more is accomplished than a general employment of the beneficial operations now available, an uncounted number of crippled individuals will be helped. In addition, with the advantages of open intracardiac surgery, valuable new operations are sure to be developed. Better, of course, than either the wide use of accepted operations or the invention of new procedures will be methods to prevent cardiac disease. Great progress has been made with rheumatic heart disease. Arteriosclerosis still offers a formidable problem, and the abolition of congenital cardiac disease through prevention seems unlikely for some time. Congenital anomalies will probably remain to challenge the surgeon for quite a while. The technical difficulties these defects offer in the more severe forms are enormous. Already the problem of exactly how to repair many intracardiac defects is greater than the problem of how to expose them. Beyond the closing of abnormal vessels and apertures, the opening of stenosed valves, and relatively simple plastic repairs, major replacements may be required. For these procedures, living homografts are needed.

SUMMARY

This article briefly describes most of the beneficial cardiac operations. Presentation is in anatomic rather than etiologic order, beginning with the extracardiac operations and following with operations on the valves and then on the septa.

In the less than two decades that have passed since the first successful closure of a patent ductus arteriosus, great progress has been made and now cardiac surgery can cure or benefit many patients who at one time were hopelessly stricken.

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Nutrition in Tuberculosis

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DISINTEREST in food, vague gastrointestinal complaints, and weight loss have always been associated in medical literature with tuberculosis, and, as a consequence, a good deal of attention to diet has been generally characteristic of tuberculosis therapy. Much of this attention must be described as merely faddish. In the history of tuberculosis, diets high in meat content have alternated with diets excluding meat. At one time, salads were viewed with great favor and then lost emphasis in favor of quantities of more concentrated foods. The one food that has been advocated consistently is milk, which was used in the treatment of tuberculosis even in antiquity. About 30 A.D., Aretaeus the Cappadocian¹ prescribed fresh milk as both food and medicine, "it seems to lubricate the windpipe, to clean, as if with a feather, the bronchi, and to bring off phlegm, improve the breathing and facilitate the discharge downwards." Galen and Celsus,² the great physicians of the third century A.D., recommended milk as one of the three basic therapeutic measures, with outdoor living and a change of climate. Perhaps, because of Galen's popularity during the middle ages and renaissance, milk — human and asses' — was still a basic food in tuberculosis therapy into the seventeenth century.

BEGINNINGS OF MODERN MEDICINE — "FORCED FEEDING"

Although medical science advanced increasingly rapidly in the nineteenth century, that was not a very happy period as far as the approach to tuberculosis was concerned. One thinks of the poet Keats dying in a small, dark Italian room which had been turned into a sweatbox by the blankets and rags stuffed into the cracks around the windows to protect him from fresh air. The

attitude of the leading medical men of the century toward nutrition was not much better. The deficiency in their approach to this important problem seems to have been a confusion between cause and effect. The thesis seems to have been, at least subconsciously, that, since tuberculosis was marked by substantial weight loss, the disease could be effectively treated by inducing a weight gain by any available means. The result was "forced feeding." This therapeutic approach is incipient in the prescription of Dr. George Bodington² of Warwickshire, England, "fresh air to make the patient breathe, good wine to bring down his pulse, a good dinner to make him fat, and an opium pill to make him sleep." In 1859, Brehmer opened a sanitarium in Gorbardsdorf in the Black Forest of Germany where he hoped for success in terms of two therapeutic approaches, a "salubrious climate" at altitude and a very high caloric diet. At the beginning of the twentieth century, Klebs and his associates³ advocated food in staggering abundance; liberal quantities of raw or rare beef, "squeezed beef juice," copious carbohydrates, 1 to 2 quarts of milk daily and 6 raw eggs sandwiched between port or sherry wine if the patient found the eggs by themselves unpalatable. In addition, the patient was further urged to consume as large a quantity of fats as he thought he could retain. The possibility of overburdening the digestive tract was considered as unimportant in comparison to the advantages accruing from copious nourishment. The popularity of this thesis is shown by the fact that as late as 1908, 16 out of 85 institutions surveyed by the Sixth International Congress of Tuberculosis favored forced feeding.

There was, of course, opposition to this attitude toward nutrition even before World War I, but the diets recommended by the moderates were still very often high by contemporary standards. The pioneer Pottenger,⁴ in a study published the same year as the survey by the

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Sixth International Conference, strongly opposed forced feeding, but, at the same time, recommended a diet high in protein featuring rare meats, raw beef sandwiches, meat juices, and milk. The patient was to be presented with "rarely more than 3 to 6 raw eggs per day." In 1913, Watson asserted that the tuberculosis patient needed a diet one-third higher in protein than a healthy person and consequently also prescribed large quantities of meat and milk for these patients.

MODERATION OF DIET

An early study of nutrition in tuberculosis was that of Goodbody and associates,⁵ published in 1901. They attempted to set up a scientific study of food intake in tuberculosis, weighing food before and after meals and collecting and weighing urine and feces. The diet they found most suitable for a patient weighing 52 kg. consisted of 120 gm. of protein, 140 gm. of fat, and 300 gm. of carbohydrate. This protein intake is comparable to modern prescriptions, and the caloric breakdown is also within modern limits, about 59 calories per kilogram. They thought the anorexia and dyspepsia which attended the forced feeding was a more important consideration than the gain in weight obtained and opposed forced feeding as a consequence.

McCann,⁶ in 1922, opposed forced feeding because he felt that it stimulated overventilation. Furthermore, he noted that the negative nitrogen balance characteristic of tuberculosis could be reversed with moderate protein intake. He considered that this reversal was a reasonable criterion of protein sufficiency. On the basis of these observations, he proposed a diet for bed patients of 60 to 90 gm. of protein and 2,500 calories per day, less than 1.7 times the basal caloric requirement for the average-sized man. Additional carbohydrates and fats were prescribed for patients allowed exercise.

Myers,² in 1924, was even less demanding. He advocated three meals a day consisting of the sort of food that healthy people eat. He believed that if the food was sufficiently varied and if sufficient consideration was given to its proper preparation, the patient could be counted on to eat adequate amounts of proteins, carbohydrates, and so forth. He also commented that of many factors which may lower a patient's resistance to tuberculosis, none is more pernicious than alcoholism. It was perhaps due to the influence of Dr. Myers' study that, since the middle of the 1920's, attitudes toward nutrition concerning the treatment of tuberculosis have been generally moderate.

THE APPLICATION OF VITAMINS

Banyai⁷ discussed the Gerson-Sauerbruch-Herrmannsdorfer diet, which had been devised in terms of the acid-alkaline theories of tuberculosis therapy of its time. This diet provided approximately 67 gm. of protein, 2,800 calories, 1.6 gm. of sodium chloride, and an alkaline ash. The German authors postulated that a neutral salt, such as sodium chloride, inhibited the lability of cellular metabolism necessary for healing. The significance of the diet, however, lay in the foods the authors chose to provide the desired acid-alkaline balance, including cream, butter, vegetables, fruits, eggs, and cod liver oil with phosphorus. In Banyai's application of this regime, he reported distinctly favorable results in 18 out of 50 pulmonary cases, with a good deal of variation in individual tolerance to the various foods. That perhaps acidity or alkalinity were subordinate to an increase in vitamin and mineral content was suggested by Mayer and Kugelmass.⁸ A very similar diet was given at Saranac, with total calories increased to 3,500, to 20 patients with far-advanced disease. Of these patients, 8 gained weight and 10 reported a decrease in sputum, although in no case was sputum conversion obtained. The authors were impressed by the reduction in certain common complaints among tuberculosis patients. The complaints of chest pain and alimentary disturbances were fewer, and decrease in fatigue was noticeable. On the basis of their observations, they suggested that the benefit resulting from the Gerson-Sauerbruch-Herrmannsdorfer diet was in reality due to its vitamin and mineral content. They felt that the acid-alkali theory on which it had been formulated was questionable.

The application of specific vitamins to tuberculosis therapy followed closely upon their discovery. Heise and Martin,⁹ in 1936, reported an invariable hypovitaminosis C in patients with pulmonary tuberculosis. They attributed this to "an abnormal chemistry of the intestinal tract" and an increased vitamin C requirement in the tissues. Whatever the reason, tuberculosis greatly increased the requirements for ascorbic acid. In the 44 tuberculosis patients studied, the requirement varied from 55 to 138 mg. daily, considerably more than their values of 15 to 20 mg. daily for normal requirements in healthy persons.

In 1943, Getz and Koerner¹⁰ noted a reduction in plasma levels of vitamin A, as well as vitamin C, in the presence of tuberculosis. For both vitamins the reduction roughly paralleled the extent of involvement. A year later they supplemented this report with the observation that plasma levels of carotene did not show any reduc-

tion even when vitamin A levels were markedly reduced.¹¹ They postulated an inadequate carotene conversion to vitamin A as one of the consequences of tuberculosis.

The studies of Lawrie and associates¹² on pneumonia and chronic nephritis must also be mentioned in connection with vitamin A, since these authors, while they did not study tuberculosis specifically, proposed a general relationship between this vitamin and infectious disease. Their most important finding was that although ordinarily no excretion of vitamin A is found in the urine of healthy persons, high concentrations are observed in the presence of an acute disease process. In pneumonia, these high concentrations ceased abruptly after the crisis was past. However, Lawrie and his associates noted that the reduction of vitamin A reserve in the liver was greater than was accounted for by the excretion in the urine.

We can scarcely be said to have anything like an adequate understanding of the role of vitamin A in tuberculosis, although these studies suggest that this subject is of some importance. However, vitamin A deficiency is not ordinarily a clinical problem, since this vitamin is present in large quantities in the fish liver oils which are commonly used for vitamin D supplementation in sanatoriums.

The role of vitamin D therapy in tuberculosis is too well known to require discussion here. But, it is of interest that such therapy, although not always recognized as such, has also been used extensively in treating extrapulmonary lesions. According to Feeny and associates,¹³ as early as 1848, Emery reported cases of lupus vulgaris cured with cod liver oil in the enormous dosage of 1 kg. daily, but the radical nature of the dosage led to the neglect of his report. Finsen introduced heliotherapy in lupus in 1897. In 1928, McConkey¹⁴ observed that cod liver oil in tomato juice given prophylactically to patients with pulmonary tuberculosis reduced the incidence of intestinal spread, an observation extended to the prevention of laryngeal tuberculosis in 1943. The development of irradiated ergosterol, vitamin D₂, in 1931 led to its use in lupus, and histologic evidence of cures with large doses of the synthetic vitamin was reported starting with Charpy in 1945.

The mode of operation of vitamins D and D₂ is not entirely understood. It is possible that these vitamins promote healing in general; at least compresses made of paraffin soaked in cod liver oil have been alleged to promote the healing of varicose ulcers. However, the more powerful effect of vitamin D in tuberculosis suggests

a direct and particular function. Page¹⁵ has shown that healing tuberculous lesions have a high concentration of phosphatase; a relationship may exist between this observation and the role of vitamin D in calcification. Raab,¹⁶ in 1946, reported that vitamin D₂ was actually bacteriocidal to tubercle bacilli in vitro and also in vivo. On the other hand, Dowling and associates¹⁷ noted that while biopsy wounds in lupus heal with difficulty, with calciferol therapy they heal almost by first intention. They suggested that calciferol may be a catalyst or an accelerator of a normal process.

Levy¹⁸ suggested that vitamin K be used routinely as a prophylactic measure to reduce the incidence and severity of hemoptysis in patients with x-ray films showing a cavity or in those who have hypoprothrombinemia. In his group of 60 patients, 32 per cent had a more or less pronounced degree of hypoprothrombinemia before vitamin K therapy.

CURRENT THEORIES OF NUTRITION

Perhaps the attitude toward diet in chronic infections such as tuberculosis is best exemplified today by Pollack and Halpern.¹⁹ They suggest that the average patient needs about 150 gm. of protein daily and, in the absence of fever, from 2,500 to 3,000 calories to insure optimum utilization of the protein. Some vitamin supplementation is recommended to insure efficient metabolism. Sebrell²⁰ advocates a liberal but not excessive provision of protein—100 to 125 gm. daily—for the average patient. He does not feel supplementary vitamins are necessary in the absence of clinical signs of scurvy and vitamin A deficiency. McLester's²¹ recommendations are the same. He feels that the patient with moderately advanced pulmonary tuberculosis with little or no fever requires about the same food and in only slightly increased amounts as healthy persons. He suggests from 100 to 125 gm. of protein daily. Ohlson and associates²² studied the diets of 33 women with arrested tuberculosis and concluded that with the exception of ascorbic acid, their principal need is the same kind and amount of food as that required by normal women. Brewer and associates²³ recommend generous amounts of meat and cereals and a quart of milk a day. In a study²⁴ of 6 women with moderately advanced active tuberculosis, the metabolism of nitrogen, phosphorus, riboflavin, and thiamine was similar to that of women free of the disease. They noted that the calcium balance tended to become negative. This last factor may be due to the effects of bed rest.

DISCUSSION

By and large, there is less concern now with nutrition in tuberculosis than has been the case for centuries. In part, this lack of concern is probably due to the great achievements made possible with antibacterial agents and surgery. Diet can scarcely be expected to command the attention today that it did in those ages when it was very nearly the basis of all therapy. But this lack of concern also reflects a general confidence in "nature" in such matters. This is largely a salutary confidence, since it excludes the eccentric and exaggerated programs of diet that have frequently been advocated in the past. However, in part it is misplaced. Most of the studies made on diet have not recognized the possibility of difference between presentation and intake. Yet everyone connected with a tuberculosis sanatorium is aware of the fact that when the physician in charge describes a "general diet" for 50 patients, there are actually 50 different food intakes. As a consequence, our knowledge of the relationship between diet and disease is more apparent than real.

We hope in the studies which follow that we can contribute to the understanding of nutrition by an attempt to correlate actual food intake with clinical response.

SUMMARY

In the early history of medicine, milk was the one element consistently represented in diets. In the nineteenth century, the dominant idea was forced feeding; the proposal was to cure tuberculosis at least in part by very nearly overwhelming the individual with nutrition. In the twentieth century, this exaggerated view has given way to moderation. The prevailing attitude at the present time is that the diet of the tuberculosis patient should very nearly approximate that of the person in good health, with somewhat more emphasis on protein and vitamin content. It is pointed out that the assumption that nutrition poses no special problem is premature, since actually very little work has been done upon the relationship of actual food intake to response.

This investigation was supported by a research grant from E. R. Squibb & Sons.

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Current Status of the Therapy of Tuberculosis

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THE DECADE since the discovery and clinical introduction of streptomycin has seen tremendous advances in the therapy of tuberculosis. The introduction of other antimicrobial agents, including isoniazid and para-aminosalicylic acid, the rapid expansion of the use of resectional surgery, and the impetus to renewed interest in the bacteriologic, immunologic, and pathologic aspects of the disease have followed. The search for an eradicated antimicrobial agent continues, but this decade has doubtless seen the most significant therapeutic results ever achieved in the entire history of the disease.

The cooperative studies by the Veterans Administration, Army and Navy, the United States Public Health Service, and the British Medical Research Council, which consisted of testing the clinical efficacy of the various antimicrobial agents and utilizing statistical studies in controlled, randomized series, have resulted in the rapid accumulation and valid evaluation of thousands of treated cases. Within a few years, tested information upon each new drug or drug combination has been made available that might well have required fifteen to twenty years under other conditions.

The morbidity rate for tuberculosis remains unchanged, although the death rate and length of hospital stay have been significantly decreased. Effective control measures remain an active need, particularly in the older age groups. Modern therapy offers the advantage of shorter hospitalization, an earlier return to productive activity and consequent economic and social gain for the patient and the taxpayer, as well as greater assurance that the patient will subsequently remain well.

In spite of the advances in antimicrobial agents and in surgery, the need for an initial period of observation, rest, and medical management in a tuberculosis hospital still remains an integral part of the therapy of the disease,

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whether pulmonary or extrapulmonary. Ambulatory treatment from the beginning is still not recommended by most competent authorities, because of an increased risk, if not disaster, for the patient. In this geographic area, with adequate facilities and beds for the care of the tuberculous patient, initial ambulatory treatment should not be necessary except in isolated and unusual situations. While modern treatment has simplified the management of tuberculosis through the availability of chemotherapy and surgery, more elaborate clinical and laboratory facilities are needed. The patient should have the benefit of his early therapeutic management from those best qualified to recognize the nuances of his disease and to outline from the beginning the type of therapy that can be expected to be most effective. The sanatorium stay now averages one year and the duration of chemotherapy usually exceeds this length of time by several months. The latter portion of the chemotherapy can be given at home on an ambulatory basis.

PULMONARY TUBERCULOSIS

Chemotherapy. The basic antimicrobial drugs have been streptomycin, isoniazid, and PAS, and their clinical efficacy in combinations remains the measure for the newer drugs as they are introduced. A vast amount of data upon the respective value of various treatment regimens in pulmonary tuberculosis has become available through the various cooperative studies. These data are based upon the comparison of randomized, previously untreated cases within each regimen and the common factors of roentgenographic improvement, sputum conversion by culture, and the closure of cavities. Tucker¹ recently reviewed the Veterans Administration, Army, and Navy experience and showed that the three basic regimens employing streptomycin and PAS are all equally effective. These regimens consist of 0.5 gm. of streptomycin daily, 1 gm. of streptomycin daily, and 1 gm. of streptomycin twice weekly, all with 12 gm. of PAS daily. The groups were comprised of patients

treated with each combination for four, eight, twelve, eighteen, and twenty-four months and followed to twenty-four months after the start of therapy. Treatment for twelve months was superior to four or eight months, and eighteen months was slightly better than twelve months.

A similar analysis was made of data from the same source for 2,187 patients randomized among three regimens, two employing isoniazid.² The same basis noted previously was employed for comparison of 1 gm. of streptomycin twice weekly and 12 gm. of PAS daily, 1 gm. of streptomycin twice weekly and 300 mg. of isoniazid daily, and 300 mg. of isoniazid daily with 12 gm. of PAS daily. The majority had received treatment for twelve months and 260 patients for eighteen months. The two regimens employing isoniazid were approximately equally effective. Isoniazid with PAS was better than streptomycin with PAS in the treatment of far advanced disease, and in all other respects was at least the equivalent of streptomycin with PAS. These results agree in general with those obtained in similar studies by the Public Health Service and British Medical Research Council.

The early emergence of bacillary resistance to isoniazid alone has resulted in preference for its use in combined therapy only. There has been some resurgence of enthusiasm for the use of isoniazid alone, based upon the apparent avirulence of tubercle bacilli which do become resistant to isoniazid and because therapy may be continued with isoniazid. Recent studies suggest that this avirulence is not consistent, that resistant strains vary in their ability to produce disease in the guinea pig, and that longer incubation results in a higher incidence of recovery of virulent strains.

A number of effective chemotherapeutic combinations are available, of which those employing isoniazid appear to be more clinically efficacious in far advanced, cavitory disease. Some physicians are reluctant to use streptomycin with isoniazid upon the basis that bacterial resistance might develop to both of these valuable drugs. No definite evidence to support this view has been reported. There is evidence that therapy with all three drugs, streptomycin, isoniazid, and PAS, is no better than the various double combinations in pulmonary tuberculosis. A number of other antimicrobial agents will be discussed elsewhere in this paper.

Good evidence from the studies indicates that the longer courses of chemotherapy are much more effective clinically. Courses of less than twelve months of therapy are not recommended. Therapy for twelve to eighteen months is now

employed for slight and moderately advanced disease and eighteen to twenty-four months or more for far advanced disease.

SURGICAL RESECTION

Surgical resection has become part of the triad of therapy in pulmonary tuberculosis: bed rest, chemotherapy, and surgical resection. Primary thoracoplasty is now seldom done in this area, except as part of a planned approach to subsequent resection. The relapse rate after thoracoplasty and the extent of impaired pulmonary function resulting from a 5 to 7 rib collapse have made resection a more desirable approach.

In the Veterans Administration experience³ of 3,828 resections in the period of 1952 to 1955, pneumonectomies declined from 11 to 5 per cent, lobectomies from 41 to 36 per cent, but segmental resections increased from 48 to 59 per cent. These percentages undoubtedly reflect the effect of longer preoperative chemotherapy which began in 1951, earlier treatment, and increased surgical experience with dissection along anatomic planes. Sputum conversion by culture was maintained in 93 per cent of the lobectomies and segmental resections and in 77 per cent of the pneumonectomies after five to eight months of postoperative observation. Surgical mortality for 2,160 segmental resections was 0.5 per cent, and 3 per cent for 1,390 lobectomies.

Physicians agree that the persistent cavity, destroyed lung, tuberculous bronchiectasis, and large localized caseous residuals should be resected. Cavitory disease with positive sputum persisting after six to eight months of antimicrobial therapy should be resected to avoid the high and rapidly increasing incidence of bacillary resistance with further therapy. The need for resection of slight or moderate residual caseonodular disease when sputum conversion by culture and roentgenographic stability of the lesions have occurred after four to eight months of antimicrobial therapy is subject to considerable controversy. The safety of the residual lesion in terms of subsequent exacerbation remains the basic question.

More data and longer post-treatment observation are necessary for those patients treated with chemotherapy alone compared with those treated with resectional surgery as well. Raleigh and associates⁴ found a 7 per cent relapse rate in patients with all degrees of pulmonary tuberculosis who received four or more months of chemotherapy and had reached the status of roentgenographic stability and negative sputum cultures. The group was followed for six months to four years after the start of chemotherapy.

This is in contrast to a 65 per cent relapse rate in those who remained sputum positive after varying periods of chemotherapy.

A six-month to three-year follow-up of 310 consecutive resections, after six to twelve months of preoperative chemotherapy, at the Veterans Administration Hospital, Minneapolis, Minnesota, has shown a 97 per cent initial rate of sputum conversion by culture for all types of resection. The relapse rate was 2 per cent in this series. Bilateral lung resections performed on 60 patients at the same hospital and followed six months to four years have shown a 95 per cent rate of initial sputum conversion by culture and no bacteriologic nor roentgenographic relapse.

An observation period of ten years will be required to evaluate adequately the role of antimicrobial therapy alone and with surgical resection, in terms of relapse. Nevertheless, the results now being obtained with these modalities of therapy are far better than were ever achieved prior to 1945. The rate of surgical complications and mortality has been consistently reduced, and lobectomy and segmental resection now carry little surgical risk.

TOXICITY

Streptomycin toxicity has been markedly reduced since the introduction of the intermittent regimen, 1 gm. twice weekly. High tone hearing loss may occur after long-term streptomycin therapy, but deafness and vestibular damage are infrequent. The use of streptomycin in the presence of renal insufficiency may be dangerous, either from the nephrotoxic effects of the drug upon an already damaged kidney or because of elevated blood levels in the toxic range. Dermatitis, circumoral paresthesia, and pain at the site of injection are more frequently encountered. Dihydrostreptomycin may be substituted in such instances, but the danger of auditory damage is greater with long-term use of this drug.

Isoniazid neurotoxicity, evidenced by peripheral neuritis, convulsions, irritability, and mental changes, has been the chief toxic manifestation and requires immediate discontinuance of the drug. These toxic reactions can be prevented by the use of pyridoxine in such individuals.⁵ Poor nutrition, particularly that associated with chronic alcoholism, has been a predisposing factor in the appearance of neuritis. The frequency of convulsions and psychoses appears related to a previous history or known manifestations of these disorders.

The pharmacology of isoniazid has been extensively studied both in animals and man.⁶

Significant variations have been found in the quantitative acetylation of isoniazid in the body in various animal species and in man. The amount of active substance remaining after acetylation of ingested isoniazid in man may vary greatly, although remaining constant for the individual. Clinical efficacy, tolerance, and toxicity are directly related to the proportion of free isoniazid which remains. Doses of less than 10 mg. per kg. rarely cause toxicity except in the alcoholic with poor nutrition.

Para-aminosalicylic acid induced gastrointestinal disturbances, particularly nausea, anorexia, and loose stools, have been the most frequent toxic reactions encountered. These conditions rarely require complete cessation of therapy, and short periods of withdrawal often result in subsequent tolerance. Small doses of chlorpromazine have been recommended as effective in promoting tolerance in more stubborn cases. Hypersensitivity reactions to streptomycin, isoniazid, and PAS are encountered but somewhat more often with the latter. Such reactions call for immediate interruption of therapy, with substitution for the offending drug or drugs if possible. Desensitization is occasionally successful.

BACTERIAL SUSCEPTIBILITY

Susceptible tubercle bacilli remain in any bacterial population, even though *in vitro* tests show a preponderance of resistant organisms. In the population being tested, clinical efficacy of the antimicrobial agent is related to the level of *in vitro* loss of susceptibility or increased resistance. Investigators do not agree definitely on the degree of concentration of the antimicrobial agent at which loss of susceptibility of the organism is to be considered clinically significant. This varies from group to group, both nationally and internationally.

The Veterans Administration Hospital, Minneapolis, Minnesota, considers an *in vitro* inhibitory concentration above 100 μ g. per cc. of streptomycin as good evidence of significant related loss of *in vivo* efficacy. Isoniazid resistance is placed at a level above 5 μ g. per cc. and PAS resistance above 10 μ g. per cc. Confirmation by more than one culture is desirable. The antimicrobial agent should be substituted when resistance at the levels noted above is encountered for any of the three drugs.

IDIOPATHIC PLEURAL EFFUSION

This early manifestation of tuberculosis has always carried a high rate of from 25 to 60 per cent of tuberculous exacerbations within the subsequent five years after onset, even after ex-

cellent sanatorium care. A study of the effect of antimicrobial therapy was begun by the Veterans Administration in 1952, and observations up to three years after the start of therapy are available.⁷ The rate of tuberculous complications occurring in 162 patients who did not receive chemotherapy was 21.6 per cent, compared to a rate of 6.8 per cent in 174 patients who received up to one year of streptomycin with PAS. Treatment with any of the three basic regimens is recommended for a minimum of eighteen months.

SKELETAL TUBERCULOSIS

Current trends in chemotherapy for bone, joint, and cartilage involvement are directed toward longer regimens, preferably twelve to eighteen months. Increasing clinical experience suggests that earlier diagnosis, especially through the use of joint, synovial, and bone biopsy, and longer periods of chemotherapy may entirely obviate surgical intervention in tuberculous tenosynovitis and in bone and joint disease of slight to moderate extent.

La Fond⁸ recently reviewed a large series of cases treated prior to chemotherapy. He concludes that chemotherapy has greatly reduced the mortality rate, produced more effective control of coexistent pulmonary disease, and reduced the complications of surgery, but the effect upon bone involvement *per se* has been difficult to assess. Chapman and associates⁹ reported similar clinical effects in patients receiving chemotherapy, although few had received as much as one year of drug therapy.

Isoniazid has been used in combination with streptomycin or PAS, as well as in triple combination. It is considered an effective addition to therapy.

For those patients who also have active pulmonary tuberculosis, chemotherapy should be planned primarily toward that lesion. Any drug combination employing isoniazid would be considered an effective regimen in skeletal tuberculosis alone, provided it were maintained a minimum of eighteen months. Sanatorium care and good orthopedic management are important facets of the successful treatment of bone and joint tuberculosis.

GENITOURINARY TUBERCULOSIS

Chemotherapy has produced excellent clinical results and has reduced the prechemotherapy mortality rate of 60 to 85 per cent within five years after diagnosis to 8 per cent in a similar five-year period in patients who received antimicrobial therapy. Lattimer¹⁰ found a 93 per

cent rate of bacteriologic conversion of the urine in medium and large renal lesions treated for a year with 1 gm. of streptomycin twice weekly and 12 gm. of PAS daily. The bacteriologic relapse rate at the end of four years of observation was 20 per cent. However, eighteen to twenty-four months of chemotherapy, instead of one year, should favorably influence the relapse rate.

Isoniazid or streptomycin alone had relatively poor initial rates of conversion and high relapse rates, undoubtedly because of the emergence of bacterial resistance to either drug alone. Lattimer achieved a 100 per cent rate of bacteriologic conversion in a small series of patients receiving streptomycin, isoniazid, and PAS for one year and observed for twenty-four months after start of therapy. He feels this treatment to be slightly more effective in advanced renal or genital lesions than either streptomycin with PAS or streptomycin with isoniazid. Use of 300 mg. of isoniazid daily with 12 gm. of PAS daily has been somewhat more effective than 1 gm. of streptomycin twice weekly with 12 gm. of PAS daily.

If bacteriologic conversion and control of the lesion with chemotherapy can be secured and maintained, the need for surgery, except in very large, destructive lesions, can be avoided. This requires that the patient be kept under adequate observation subsequent to chemotherapy. Lattimer found the need for nephrectomy for moderately advanced and some of the larger renal lesions sharply reduced as a result of long-term chemotherapy, and he has also extended this conservative approach to epididymal lesions as well.

If significantly lower relapse rates are to be realized, the duration of chemotherapy should be for a minimum of eighteen to twenty-four months, depending upon the extent of the involvement. The combinations of 1 gm. of streptomycin twice weekly with 12 gm. of PAS daily or 300 mg. of isoniazid daily with 12 gm. of PAS daily appear effective.

MILIARY AND MENINGEAL TUBERCULOSIS

The results of antimicrobial therapy with streptomycin and PAS in these previously almost universally fatal infections have been dramatic. The addition of isoniazid has even more significantly lowered the mortality rate achieved with streptomycin and PAS. The current Veterans Administration, Army, and Navy experiences employing isoniazid,¹¹ with an observation period of eighteen months after the start of therapy, are shown in table 1. The comparison with other regimens of therapy is also shown.

TABLE 1

SURVIVAL RATE OF PATIENTS WITH MILIARY AND MENINGEAL TUBERCULOSIS OBSERVED FOR EIGHTEEN MONTHS AFTER START OF CHEMOTHERAPY. FROM VETERANS ADMINISTRATION, ARMY, AND NAVY STUDY

Type of tuberculosis	Streptomycin alone	Streptomycin and PAS	Streptomycin and isoniazid or streptomycin and isoniazid and PAS
Miliary alone	63 per cent	82 per cent	95 per cent
Meningitis alone	25 " "	50 " "	76 " "
Miliary and meningitis	16 " "	40 " "	80 " "

Observations five years after the start of therapy are available for patients treated with streptomycin alone or with streptomycin and PAS. Those surviving twenty-four months had a better than 95 per cent chance of living five years, although the number surviving twenty-four months was significantly greater when treated with streptomycin and PAS. Similar results are reported in children when isoniazid is added to the therapy.¹² A 70 per cent survival rate among 69 children, the majority under 5 years of age, was achieved in the treatment of meningitis alone or combined with miliary tuberculosis. None of the group developed meningitis after miliary disease, if they had received isoniazid as part of their therapy.

The recommended regimen¹³ for adults is two years of continuous antimicrobial therapy, employing streptomycin, isoniazid, and PAS. During the first three months, 1 gm. of streptomycin daily, 12 gm. of PAS daily, and 8 to 10 mg. per kilogram of isoniazid or not less than 500 mg. per day should be given. Streptomycin should then be reduced to 1 gm. twice weekly and isoniazid to 300 mg. per day and both continued at that level with PAS. Cerebrospinal fluid proteins and sugar may take more than three months to return to normal levels, and abnormal levels should not dictate continued daily use of streptomycin or high isoniazid dosage because of possible auditory or vestibular damage or other toxicity. A similar regimen should be used for the treatment of miliary tuberculosis.

Cortisone has been used with some success in addition to chemotherapy, in the patient gravely ill with tuberculous meningitis or in those who do not respond to chemotherapy. It should never be used for tuberculosis without the cover of adequate chemotherapy and should not be maintained for long periods.

Since the introduction of isoniazid, intrathecal therapy with streptomycin has been generally abandoned in the treatment of tuberculous meningitis. Isoniazid diffuses freely into the cerebrospinal fluid at high concentrations, and the results have been at least equal to intrathecal

therapy without the disadvantage of frequent spinal taps.

OTHER ANTIMICROBIAL AGENTS

Viomycin. This antibiotic, produced from a strain of *Streptomyces*, was introduced in 1951. It is effective against the tubercle bacillus in vitro, but less effective clinically than streptomycin or isoniazid at the dosages now employed. Daily dosage range of 40 to 60 mg. per kg. of body weight resulted in decreased renal function, electrolyte imbalances, gastrointestinal disturbances, allergic manifestations, and both auditory and vestibular nerve damage after very short periods of treatment. A reduction of dosage to 2 gm. twice weekly, intramuscularly, has markedly reduced the incidence of toxicity. Complete and careful laboratory control is necessary when it is used, even with the reduced dosage. Viomycin is not recommended for use as a primary antimicrobial agent, but does have clinical indication and effectiveness in patients whose organisms are resistant to one or more of the basic drugs.^{14,15} The administration of viomycin with either isoniazid or PAS is recommended for greatest therapeutic effect. Its use in combination with streptomycin is contraindicated because each is a potential nephrotoxic agent.

Pyrazinamide. This drug resembles nicotinamide, but with a pyrazine instead of a pyridine ring in its structure. It is given orally. Although quite effective clinically, complete bacterial resistance develops usually within six to eight weeks if given alone. The regimen now being investigated by the Veterans Administration and other groups consists of 3 gm. per day with 300 mg. of isoniazid daily. This combination appears to have clinical promise, particularly in the treatment of patients resistant to streptomycin and PAS, as well as in delaying the emergence of bacillary resistance to pyrazinamide.

Infected animals treated with pyrazinamide and isoniazid for four months, but with a larger dosage, have shown a striking clinical response with almost complete eradication of tubercle

bacilli from their tissues. This response has not been observed with any other drug or drug combinations, but the variation between human and animal tissue responses must be considered. This response has not yet been encountered in man.

The chief problem of toxicity has been that of hepatitis, with or without jaundice, which may appear as late as the sixth month or more of therapy. Of 300 patients in the Veterans Administration study, 14 per cent developed abnormal liver function tests, chiefly bromsulphalein retention, during the first four months of therapy. Many of these patients were continued on therapy without further difficulty. Mild jaundice developed in 2 per cent of the group, which necessitated discontinuance of the drug. No fatalities occurred in the Veterans Administration study, although 5 had been reported by other investigators. Liver biopsies and autopsy material have shown changes consistent with a nonspecific toxic hepatitis of varying degree.

Cycloserine (Oxamycin). This antibiotic, derived from a strain of *Streptomyces*, has been identified as D-4-amino-3-isoxazolidine. High concentrations are secured in all body fluids when the drug is given either orally or intramuscularly. It has been found to be particularly effective, in vitro, against tubercle bacilli which are entirely resistant to streptomycin and isoniazid. The dosage is 1 gm. per day.

Clinical trials have shown evidence of therapeutic efficacy, but of a lower order than that usually secured with combinations of the three basic drugs. Several cooperative clinical and pharmacologic investigations of this antibiotic are now under way.

Neurotoxicity, manifested chiefly by irritability,

personality changes, and convulsive seizures, has been a disturbing side reaction. These manifestations appear to be related to the blood level of the drug. At present its toxicity and need for laboratory control would appear to limit its general use.

SUMMARY

A tested and effective variety of drug combinations, employing streptomycin, para-aminosalicylic acid, and isoniazid, is now available for the treatment of tuberculous disease. The problems of toxicity and bacillary resistance have been significantly reduced by giving these agents in combination and by the intermittent rather than daily dosage of streptomycin. Longer duration of therapy is recommended, preferably twelve to eighteen months. Resectional surgery has become an important adjunct to chemotherapy in pulmonary tuberculosis, although its indications remain to be more clearly defined. The extrapulmonary manifestations of tuberculosis are showing equally satisfactory responses to chemotherapy, with the possibility that less surgical intervention may be required in the future. Of these, the effect of therapy upon military and meningeal tuberculosis has been most striking.

The need for adequate sanatorium care and management of the tuberculous patient during the initial phase of his disease requires re-emphasis. The extent and variety of tuberculous disease, previous antimicrobial therapy, the desirability of oral or parenteral administration of drugs, and other practical and clinical considerations will undoubtedly influence the choice of chemotherapy for the individual patient.

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A Tuberculin Testing Program in North Dakota Schools

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TUBERCULIN TESTING has been done in North Dakota schools for a number of years; however, to date a uniform program has not been in effect. In the past, tuberculin testing has been done by private physicians, health units, and local and county health officers. Frequently, children in grades 1, 4, 7, and 9 were tested and contacts of positive reactors tested as possible sources of infection. Open cases of tuberculosis have been found by this method.

In April 1954, the certification program of the American School Health Association was adopted and sponsored by the North Dakota Tuberculosis and Health Association. This program was adopted after consultation with Dr. J. A. Myers, chairman of the committee on Tuberculosis of the American School Health Association.

A committee to sponsor the program was appointed consisting of Dr. Joseph Clark of Minot, North Dakota; Dr. Ellis Oster of Ellendale, North Dakota; and Dr. Percy L. Owens of Bismarck, North Dakota.

This year the committee has been enlarged to include two new members from the eastern part of the state. The largest number of accredited schools so far are in the central and western parts of the state. It was thought that new members would stimulate the program in the eastern section. The new members are Dr. Ralph Pray of Fargo, and Dr. T. Q. Benson of Grand Forks.

The program of the American School Health Association is uniform and the schools find certification an incentive for participation. That the educational value in the program is considerable cannot be denied.

Requirements for certification are as follows:
Class A certificate.

1. At least every other year 95 to 100 per cent of the school children must be tested with a tuberculin patch test or with a Mantoux test of adequate dosage (1.0 mg. of old tuberculin or 0.005 of purified protein derivative for those not

reacting to a smaller dose) with the following subsequent procedures.

a. Children of grade school age who react to tuberculin need no other phase of the examination unless symptoms or history are considered of sufficient importance. X-ray films of the tuberculin reactors are always valuable and, if facilities are available, this procedure is advisable. Otherwise, the x-ray films of children below the age of 12 can be eliminated. However, family physicians and the local health department should be notified in order that the source of their infection may be sought among their adult associates.

b. All tuberculin reactors must have x-ray film inspection of the chest during the freshman and senior years of high school, and, whenever a shadow is found, a complete medical examination is required to determine the etiology of the lesions causing the shadow.

c. All nonreactors to tuberculin from kindergarten through high school must be retested at least every two years and preferably every year. Those who become reactors after the last testing shall be treated in the same manner as those who reacted to the first test.

2. The Mantoux test must be administered to all the personnel of a school or system to be certified.

a. All nonreactors must be retested every two years.

b. All reactors on first or subsequent testing must have an x-ray film inspection of the chest. Whenever a shadow is found, the examination must be completed to determine whether the lesion casting the shadow is tuberculous, and if so, whether it is of present clinical significance.

c. All reactors, regardless of roentgen findings in the chest, must be examined with reference to tuberculous lesions in other parts of the body which might be discharging tubercle bacilli.

3. All students and personnel who are found to have progressive tuberculosis in any part of the body, that is, in the contagious stage or threatening to become so in the near future,

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TABLE 1
1954-1955 SCHOOL YEAR

County	Schools certified	Pupils tested	Pupils positive	*Per cent positive
Bottineau	14	1,660	21	1.3
Burke	6	374	1	
Burleigh	6	1,905	49	2.6
Dickey	49	1,376	11	0.79
Dunn	5	785	16	
Foster	5	761	26	
Hettinger	3	34	1	
LaMoure	31	620	7	
McHenry	23	1,109	16	1.4
McIntosh	54	1,106	6	0.54
McKenzie	34	1,103	117	10.6
McLean	8	1,440	44	3.1
Mountrail	1	426	21	*
Pembina	1	101	1	
Pierce	1	638	17	
Renville	5	1,014	13	1.3
Sargent	1	180	7	
Steele	24	433	2	
Towner	4	793	10	
Ward	25	6,265	156	2.5
Wells	40	966	15	
Totals	340	23,089	557	2.41

*Percentages are listed for counties where 1,000 or more students were tested.

shall be removed from school until adequate treatment has been administered and the danger of contagion is remote.

Class B certificate.

Qualifications for a class B certificate are available to schools which follow the procedure outlined above by testing only 80 to 95 per cent of the children from kindergarten through high school.

Material for tuberculin testing is furnished by the North Dakota Tuberculosis and Health Association. The standard Volmer patch tests are supplied. Purified protein derivative is supplied in three strengths, first, intermediate, and second. Many physicians prefer the intermediate strength. Printed material is also supplied by the association, such as parents' consent slips, pamphlets on tuberculin testing, booklets describing the program "North Dakota's School Certification Program for Tuberculosis Control," negative and positive reactor notification forms for parents and applications for schools desiring certification. Award certificates are provided by the American School Health Association.

Students are tested with tuberculin only done after a signed consent slip from the parents. School personnel have at times been difficult to test because of religious grounds or because of a simple aversion to the test.

A tuberculin test might well be a requirement in future teacher's contracts. At times it has been necessary to impress physicians with the

TABLE 2
PERSONNEL

County	Personnel tested	Personnel positive
Bottineau	145	48
Burke	32	3
Burleigh	78	28
Dickey	104	13
Dunn	47	9
Foster	42	2
Hettinger	3	2
LaMoure	46	6
McHenry	79	22
McIntosh	95	4
McKenzie	77	12
McLean	83	12
Mountrail	22	4
Pembina	7	1
Pierce	29	9
Renville	71	12
Sargent	20	8
Steele	34	5
Towner	60	2
Ward	386	99
Wells	87	4
Totals	1,547	305

Percentage of personnel positive: 19.9.

TABLE 3
ACTIVE CASES

County	Among pupils	Among personnel	Among contacts	Totals
Burke		1		1
Mountrail			2	2
Steele	1			1
Ward	1		3	4
Totals	2	1	5	8*

*Since this tabulation, 3 more active cases have been reported, bringing the total to 11.

necessity of a tuberculin test regardless of negative chest findings.

A large proportion of the patch tests were applied and read by public health nurses under the supervision of health officers. According to the North Dakota superintendent of public instruction, there are 3,051 schools in North Dakota. Pupils from grades 1 through 12 number 121,542. The tables indicate the results of the program so far.

Since August 2, 1955, an additional 5,177 pupils have been tested and 208 schools have been certified, which brings the total to 28,266 children tested and 548 schools certified.

Gray,¹ in a report on a tuberculin patch testing program in St. Louis County schools, stated that the national average, using the mobile x-ray unit as a case-finding method, is 1 active case of tuberculosis per 1,000 persons who have roentgenograms made.

(Continued on page 36A)

30,000 per 100,000

J. ARTHUR MYERS, M.D.

Minneapolis, Minnesota

THE FIRST STATE tuberculosis association in America was organized in 1892 by Dr. Lawrence Flick under the name, Pennsylvania Society for the Prevention of Tuberculosis. Only ten years before, Koch had announced the discovery of the tubercle bacillus. Two years before this organization was effected, Rivolta had proved that the tubercle bacillus which attacks fowls is different from that usually recovered from people. This was named the avian type. In 1896, Smith described a bovine type which differs from both the human and avian types. Tuberculin was produced by Koch in 1890, the x-ray was discovered by Roentgen in 1895, and the bronchoscope was invented by Killian in 1898. Thus, most of the armamentarium now in use became available just before the close of the nineteenth century.

The National Tuberculosis Association was organized in 1904, and the address of the first president, Dr. E. L. Trudeau, has since served as a tuberculosis bible for many workers. State after state followed the Pennsylvania precedent until each had an organization. Then came intrastate societies with the county as the unit. Today there are 3,000 such organizations in this country under the headship of the National Tuberculosis Association. Great national organizations of nurses and physicians entered the tuberculosis campaign, including the American Nurses' Association; the American Medical Association; the American Sanatorium Association, which became the American Trudeau Society in 1939; the American College of Chest Physicians; and many others.

In all history prior to the closing decades of the nineteenth century, tuberculosis was the greatest destroyer of mankind. No weapon against it had been found. Indeed, the disease was not proved contagious irrefutably until Villemin reported his classical work in 1865.

In 1905, Trudeau predicted that when the citizenry of the nation became well informed, all facilities necessary to control tuberculosis would be forthcoming. Soon educational campaigns were under way everywhere. Sanatoriums began to spring up here and there similar to the one Trudeau had opened in 1884. Patients with con-

tagious cases were removed from homes and isolated in these institutions.

MENACE OF BOVINE TYPE OF TUBERCLE BACILLUS

Tuberculosis had long been destructive among domestic animals, particularly cattle. Dr. Leonard Pearson, with the assistance of a student, Charles E. Cotton, University of Pennsylvania, administered the first tuberculin tests to cattle in this country in 1892 and found by necropsy that all reactors possessed tuberculous lesions, while no area of disease could be found in non-reactors. This finding confirmed results that had recently been observed in Europe and, thus, for the first time provided a means by which tuberculosis could be eradicated from cattle.

Although Robert Koch seriously questioned the concept that bovine tuberculosis is transmissible to man, it was Dr. M. P. Ravenel, Pennsylvania State Livestock Sanitary Board, who, in 1901, brought forth irrefutable proof that the bovine type of tubercle bacillus causes progressive and even killing disease in people. From autopsy material of a child who died from tuberculous meningitis, Ravenel proved conclusively that the tubercle bacilli were the bovine type. It soon was learned that the bovine type of tubercle bacillus is as destructive in people as the human type. Thus, the veterinary profession was destined to solve not only a serious economic problem but also to contribute significantly to the solution of the most serious public health problem.

MORTALITY

As the sanatorium building program and the veterinarians' work were getting under way, tuber-

Presented in part before the sixty-third annual meeting of the Pennsylvania Tuberculosis and Health Society, the Pennsylvania Trudeau Society, and the Pennsylvania Conference of Tuberculosis Workers, Pittsburgh, April 26, 1955; the fiftieth anniversary celebration of the Illinois Tuberculosis Association, the Illinois Trudeau Society, and the Illinois Conference of Tuberculosis Workers, Peoria, April 28, 1955; the annual meeting of the Oregon Tuberculosis and Health Association, Portland, May 11, 1955; and will be presented at the Arizona Tuberculosis and Health Association, Phoenix, April 20, 1956.

culosis was wreaking havoc among people and domestic animals as had been the case since the dawn of history. When this century opened, almost 200 persons per 100,000 population were dying annually. However, the efficacy of education, sanatoriums, and control among animals soon became manifest. Mortality rates decreased, reaching 10.6 per 100,000 in 1954. In recent years, the age distribution of deaths is of extreme significance. The number of deaths among persons 25 years of age or younger decreased markedly. From 60 to 75 per cent of the deaths have been occurring among persons 40 years of age or older, and approximately 40 per cent among those aged 65 and older. These persons belong to that generation of people who received almost no protection against tubercle bacilli as infants and children. They resemble the preceding generations, when approximately 100 per cent of the people became infected during childhood. For this generation, now comprised of older people of 40 years of age or more, the sanatoriums were built. They paid the price in loss of life, which caused mortality rates to soar. They paid the price in prolonged incapacity, which filled sanatoriums and left large numbers to be cared for in homes. They paid the price by infecting their children and other associates, many of whom became doomed to illness and death. The surviving members of this older generation are now contributing a preponderance of the deaths from tuberculosis annually. Evidence indicates that these older people are becoming ill and dying from tuberculosis which was contracted in childhood. Ever since that time, they have harbored tubercle bacilli in necrotic tissue. That which happened to tremendous numbers of the present older generation earlier in life is still happening to survivors, namely, their tubercle bacilli become unleashed and the result is clinical disease.

Present mortality rates show the effectiveness of effort against tuberculosis which has resulted in protection against infection in the younger age groups. If no infection is present, neither illness nor death can occur.

MORBIDITY

At the opening of this century when the mortality rate was in the neighborhood of 200 per 100,000 population, the number of clinical cases seemed too large to enumerate. Probably about 10 such cases occurred for every death, which provided a case rate of approximately 2,000 per 100,000 population. As mortality began to decline, a corresponding decrease in morbidity occurred which has continued and has now reached

such a level—approximately 50 per 100,000—that in many places a large number of sanatorium beds are vacant. Extreme effort was exerted in obtaining sanatoriums. To close them prematurely may pose an urgent problem in the future. Several factors now operating could markedly change morbidity rates. Evidence is accruing to suggest strongly that antimicrobial drugs do not have the permanent effect that was earlier anticipated. Evidence does not indicate conclusively that these drugs destroy all tubercle bacilli in the bodies of persons who have clinical disease. Therefore, persons thought to have been “cured” are still harboring organisms which may still result in reactivations of old lesions and development of new ones. Indeed, such evidence is already apparent on a large enough scale to cause alarm.

RECENT DIVERGENCE OF MORTALITY AND MORBIDITY CURVES

Reference to the number of cases reported can be deceiving unless situations and conditions are carefully considered. In 1920, the number of newly reported cases in some places did not appear greatly higher than those reported in 1954. With reference to reporting cases, the situation in 1920 was markedly different from that in 1954. In 1920, the vast majority of cases reported were those of sick people. They went to their physicians, clinics, and so forth, because of symptoms. Later, the slogan for the early diagnosis campaign of the National Tuberculosis Association was based on symptoms which were thought to be early manifestations of the disease. This was before chronic tuberculosis was generally known to pass usually through a long silent period when the disease can be detected in apparently well people. If methods of finding the disease before symptoms appeared had been in practice in 1920, the number of cases reported that year could have been nearly doubled. By 1954, apparently healthy people were being examined for tuberculosis in the offices of physicians, in hospitals, clinics, and mass surveys, and many persons without symptoms were found to have evolving disease and were reported. If only those who sought assistance because of symptoms had been considered in 1954, the number of cases probably would have been less than half of the total number reported.

Since 1947, antimicrobial drugs have been used extensively and so suppressed tubercle bacilli that many tuberculous patients were still alive in 1954, who without these drugs would have died. Thus, the number of tuberculous persons still living has increased. While mortality rates

decreased precipitously because drugs were available which postponed death for numerous persons, the new case rates declined more slowly because of a large reservoir of tubercle bacilli in many persons who previously were well. Among these infected persons, the annual crop of gross disease evolved just as it had in earlier years. If a drug had been available which could have reached and destroyed tubercle bacilli in the old walled-off lesions from which new disease emanates, the case rate could have dropped as rapidly as the mortality rate. Without such a drug, as much gross disease developed percentage wise among previously infected persons as at any time in history. The decrease in the number of cases which did occur was the result of previous control measures which reduced the incidence of infection. The smaller the number of infected persons, the fewer gross areas of disease develop.

MORBIDITY AND MORTALITY RATES UNSATISFACTORY CRITERIA

Mortality rates have never been satisfactory criteria for determining the magnitude of the tuberculosis problem anywhere, for such reasons as: (1) Many persons who have clinical and even contagious tuberculosis do not die from this disease. (2) Many people with previously unrecognized clinical tuberculosis die from other acute and chronic conditions, and tuberculosis is not mentioned on death certificates. (3) In recent years, antimicrobial drugs have at least postponed deaths from tuberculosis on a large scale, and, thus, mortality rates have decreased precipitously without significant change in other phases of the tuberculosis situation.

With the rapid decline in death rates from tuberculosis, obviously a sense of false security on the part of the public was sure to develop. Therefore, much emphasis has recently been placed upon morbidity rates, which are definitely less reliable than mortality rates.

For example, clinical cases have rarely been satisfactorily reported as evidenced by the fact that health departments are first notified of many cases by death certificates. Also, disparity in reporting is pronounced. In some places, only proved active clinical cases are reported, while, in other areas, almost any pulmonary abnormality is recorded as a case of tuberculosis. Mass x-ray surveys have resulted in many reports of this kind. In 1953, in the United States, 89,000 new cases were reported under the categories of active or probably active. Obviously, the probably active cases were not well documented in the sense that tubercle bacilli were recovered

and the question of how many were tuberculous is justified. It is well known that some persons are still sent to sanatoriums with a diagnosis of tuberculosis, whose illness proves to be caused by malignancy, sarcoidosis, and so on. Recently, in one sanatorium, enough patients with pulmonary histoplasmosis were found treated for tuberculosis to warrant the estimate of 1,300 such cases now in sanatoriums in the histoplasmosis endemic area. Among 24 persons being treated in a hospital for tuberculous pleurisy with effusion, thoracotomy and biopsy revealed that 9 were nontuberculous. An x-ray shadow of a pulmonary lesion alone never justifies diagnosis of any condition. Nevertheless, many diagnoses of tuberculosis are being made without further documentation.

By the old definition, tuberculosis was considered to be present only when gross lesions had resulted in illness and tubercle bacilli were recoverable. All the stages in the evolution of the disease, from the initial invasion and focalization of tubercle bacilli up to the presence of extensive disease, were ignored.

DAWNING OF NEW ERA

A new era has dawned. This is the era of eradication of the tubercle bacillus. In the past, most funds, time, and effort were spent on the damage produced by the tubercle bacillus. When the attack was started on this disease, such inroads had been made that the ill and the dying demanded every attention that could be mustered. The work was done so well and the disease is now so in hand that the era of tubercle bacillus hunting and destruction is upon us. However, seeking, isolating, and treating contagious cases must be continued, for this task is not finished.

At the moment, the tuberculosis problem is limited to those people harboring tubercle bacilli. These persons constitute the future problem, in addition to those who become infected from them or from other sources. Most persons now harboring tubercle bacilli are apparently well. If x-ray film inspections were made of the chests of the 55,000,000 persons in the United States with tubercle bacilli residing in their bodies, relatively few would be identified. However, all such persons have lesions, but most of them are not now large enough or do not have the consistency to cast visible shadows on x-ray films. Some have lesions which are located in the 25 per cent of the lungs not visualized on usual films, and, in others, lesions are located extrathoracically.

Necropsy examinations and observations of thoracic surgeons have shown that far more areas of

tuberculosis, including gross lesions, are missed than found by x-ray film inspection of the chest. The mass x-ray survey, therefore, is of little help in determining the true tuberculosis situation in any place. Nevertheless, in some places, it is still of value in screening out contagious disease. In many places outside the cities, the mass x-ray survey is obsolete. Too few clinically significant cases are found to make the procedure economically sound, and this is especially true since a far superior method is now available. In many areas, the time has arrived when x-ray film surveys are of value only in limited segments of the population, such as in elderly persons, inmates of institutions for the mentally ill, and prisons. Its greatest value is its periodic use among tuberculosis reactors who should be identified everywhere.

The true magnitude of the tuberculosis problem can be determined only by testing everyone, regardless of age, with tuberculin. This test is the master key in the program leading to eradication of the tubercle bacillus. Its values are so great in the tuberculosis eradication campaign that some of the more important points are briefly discussed.

1. Tuberculosis in the human body is detected earlier by the tuberculin test than by any other procedure. Within a few weeks after tubercle bacilli enter the body, their presence can be detected by this test.

2. It is our best epidemiologic procedure. Every person who reacts characteristically to tuberculin has been infected by someone else. If the reactor at any age in life has recently become infected, the person responsible for the infection is not far away in point of time and can often be found among adult associates. By testing children with tuberculin and examining the adult associates of reactors, from 10 to 13 times more clinical and contagious cases of tuberculosis have been found than by mass chest x-ray film surveys.

3. The test determines the magnitude of the tuberculosis problem in any group of people, since those who are harboring tubercle bacilli are readily detected, and these persons constitute the problem.

4. The effectiveness of a tuberculosis control program can be determined accurately and with reasonable promptness only by the tuberculin test. Testing all with tuberculin before the program starts fixes the base line. Five years later, testing the children born since the program began determines whether they have been better protected than those of the same age preceding the program.

5. Responsibility for infection leading to clinical

disease can usually be determined only by the tuberculin test in cases that come to litigation. The responsibility belongs where the infection was permitted to occur.

6. Persons can be selected who should be examined promptly and periodically thereafter.

7. The tuberculin test may become a means of determining the best time to treat tuberculosis with antimicrobial drugs, with the hope of actually curing the disease and thus avoiding much destruction of tissue, illness, or death.

8. In such cases, the tuberculin test may determine when sufficient treatment has been administered. When all bacilli have been destroyed, the individual should revert to a nonreactor to tuberculin.

9. Testing with tuberculin has superb educational values.

To test the 166,000,000 citizens in this country with tuberculin is a sizeable task. Some individuals are sure to say this proposal is insurmountable. The objectors will be persons of the same type encountered by the veterinarians when they proposed tuberculin testing the entire cattle population of this nation. Nevertheless, the veterinarians succeeded. Testing people with tuberculin provides the same information as is obtained by testing cattle. Such a task is well within the realm of physical possibility and is indispensable if eradication of the tubercle bacillus is our goal.

The program now becomes one of refinement in tracking down tubercle bacilli and keeping them corralled. The magnitude of the problem demands greater activity than has yet been seen in the tuberculosis eradication movement. Larger funds and more workers will be required, since the entire citizenry must be informed to insure cooperation in the fight against the tubercle bacillus rather than just the disease it produces. Response of the public will be assured when it is known that sights have been raised and the target is far beyond that of control to one of eradication. Nurses and physicians everywhere, and particularly those in general practice, must be brought back into the fold. Indeed, they must do the lion's share of the work, and they are capable of doing it. Of the 200,000 physicians in this country, 90,000 are in general practice. The 552,618 registered nurses must be organized and the part appraised that each is to play in the program.

Some county medical societies will probably contribute to the program by assuming responsibility for the first community and countywide testing. This has been done by a few societies and others are apt to follow suit.

The most approved method of administering

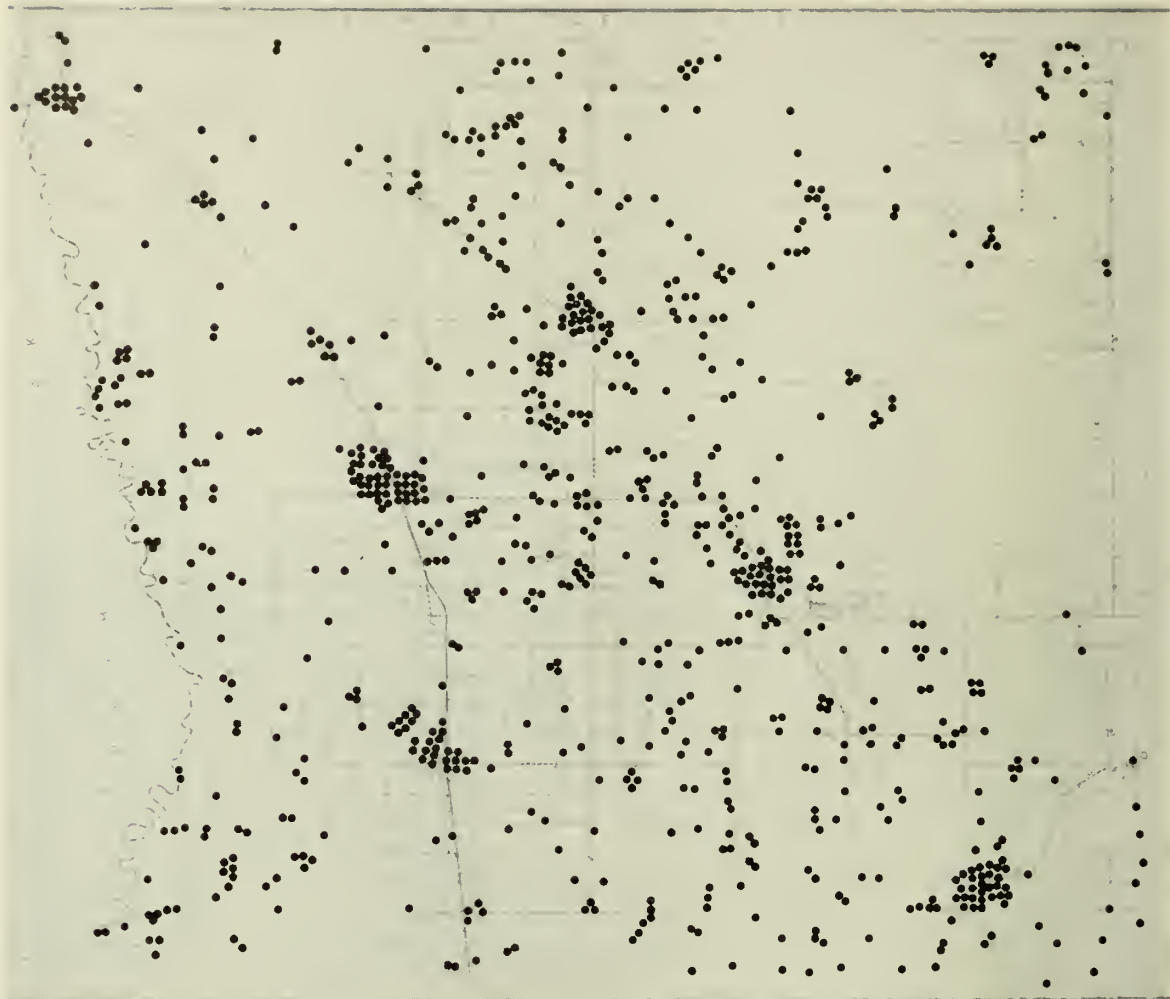


FIG. 1. Map of Kittson County, Minnesota. Dots indicate the residents of persons harboring tubercle bacilli as manifested by the tuberculin reaction.

the tuberculin test consists of injecting tuberculin into the layers of the skin. However, Michael L. Furcolow, United States Public Health Service, Kansas City, is trying to devise a patch test which may be nearly as accurate as the intracutaneous method.

In physicians' offices and clinics, nurses give hypodermic injections and intradermal tests. There is no reason why they should not administer both needle and patch tuberculin tests in a statewide program. In fact, they are already carrying out this responsibility in many places in this country. With good organization and some experience, one person can easily administer 300 intracutaneous tuberculin tests per hour.

With such a program, the people of the United States can be divided into two groups: those who are harboring tubercle bacilli and those who are not. Such information has never before been available. As a result, the subsequent attack on

tuberculosis will be on a scientific and practical basis. The percentage of tuberculin reactors will vary somewhat from place to place. Probably in entire counties not more than one-fifth of the individuals, mostly in the upper age bracket, will react to tuberculin. In other areas, 40 per cent or more may be infected. The average for the nation is probably about 1 in 3.

Formerly, spot maps were produced on which thumbtacks indicated where persons had died from tuberculosis. Later, maps were made to show where clinical cases had been found. Now a map should be made for each of the 3,070 counties in the United States showing where each person resides who is harboring tubercle bacilli as manifested by the tuberculin reaction. Billions of tubercle bacilli are in each of these homes. Miss Mary Goddard, public health nurse, Kittson County, Minnesota, in cooperation with the State Department of Health and the Minne-

sota Tuberculosis and Health Association, has produced such a map (figure 1). She and her associates know where tubercle bacilli now reside in that county. Moreover, they know how to keep them coralled. Kittson is a county of so-called low tuberculosis incidence, since only 3 "new cases" were reported and only 1 died in 1954. Indeed, only 13 persons were currently registered as having tuberculosis. Nevertheless, 2,100 persons still harbored tubercle bacilli among Kittson County's population of 9,600. In contrast, among the 15,526 cattle of the county, no tuberculin reactor was found in 1954.

Technics already in operation in several states will hasten the solution of the problem. For example, the Committee on Tuberculosis of the American School Health Association devised a method, which has been in operation for a decade, of certifying schools that meet standard qualifications. As schools qualify, the certificates are signed by the president and executive secretary of the American School Health Association, the executive secretary of the state tuberculosis and health association, and the chairman of the state committee of the American School Health Association. This project stimulates interest and activity in tuberculosis eradication not only in the schools but in the entire community. It has prevented such persons as the tuberculous teacher, bus driver, and students, particularly those of high school age, from transmitting tubercle bacilli to personnel and students. Its educational value is immense.

In 1954, there were in the United States more than 16,000,000 preschool children. There were 27,118,000 children from 5 to 14 years of age and 12,854,000 from 15 to 19 years of age. There were more than 1,000,000 professional and approximately 200,000 nonprofessional school employees. Educational opportunities are unlimited when both children and personnel participate in school programs designed to fight tuberculosis.

When tuberculin tests are performed, reactors must be examined. X-ray film inspection of chests of adults should be included, keeping in mind that 10 to 15 per cent of all clinical tuberculosis develops extrathoracically. Among tuberculin reactors, not more than 1 per cent would be expected to show evidence of clinical disease on the first examination. Some of these persons are already harboring contagious disease and need to be managed accordingly. Others have evolving lesions not yet contagious which can be promptly controlled. Among the remaining 99 per cent with no evidence of clinical disease, an annual crop of evolving lesions will have to be harvested. This necessitates periodic examina-

tions of all reactors which, if well done, will detect slowly growing lesions before they produce symptoms or become contagious. Thus, the tubercle bacilli will be kept coralled in the bodies of those who possess them.

Children and adults who have not been infected and, therefore, do not react to tuberculin must be retested periodically. Antimicrobial drugs may soon be available which will destroy all bacilli found in new reactors.

Among the 89,000 active or probably active cases reported in the United States in 1953, 78 per cent were in an advanced stage. The solution to this problem consists of finding and examining periodically the individuals who are harboring tubercle bacilli. This has been done in sufficient volume and long enough to leave no doubt as to its efficacy. It results in finding chronic lesions destined to evolve in the minimal stage before they cause symptoms, are contagious, and when nearly all can be treated successfully.

This program is economically sound beyond question. Although additional funds are necessary to locate the tubercle bacilli and to keep them coralled, many times the initial cost will be saved in reduced hospitalization and so on.

Aiming at the eradication goal and driving toward it by the method here described provides a long-term program for every tuberculosis and health society. It is regrettable that some tuberculosis societies in this country are now floundering for lack of a program. With a sharp decline in mortality and morbidity, they question whether their continued existence is justified. With a job less than half finished, other outlets are being sought. To relax effort now, means that bacilli will spread, more gross and contagious lesions will develop, and the problem can soon become as acute as it was a half century ago. When tuberculosis societies and their allies become tubercle bacillus hunters, they will have a large-scale fundamental program for decades and the job will not be completed as long as a single person is infected with tubercle bacilli.

VETERINARIANS ESTABLISHED PRECEDENT

When the veterinary profession began its program to eradicate tuberculosis from cattle herds, not only was the economic loss tremendous because of deaths in the field and the reduced production of dairy products among sick animals, but also many people had acquired tuberculosis from animals and their products. The public health aspects of this problem can be appreciated by knowing that in areas of the world where tuberculosis is still rife among cattle, one-half or more of the people with tuberculosis of pe-

ripheral lymph nodes and skin have the bovine type of disease. This is also true of 20 per cent of the lesions which attack bones, joints, organs of the genitourinary tract, 1 to 6 per cent of lung disease, and 25 per cent of acute fatal tuberculous conditions, including miliary disease and meningitis. Now, in the United States, a person rarely becomes infected from cattle.

Possibly some people in this country are now criticizing the veterinary profession for continuing to test all cattle periodically because only 1 in 1,000 animals is found infected. If so, these persons should be appraised of the fact that the veterinarians' experience has convinced them that to discontinue testing now could prove disastrous. Veterinarians know that as long as a single animal in this nation is infected with tubercle bacilli, the job is not completed.

Because of their extensive experience and magnificent accomplishments, veterinarians know more about the values of the tuberculin test than any other group of workers. If the 18,276 veterinarians in this country were brought more actively into this campaign to eradicate the tubercle bacillus from people, they would give advice and support that could be obtained from no other source.

ACTUAL CASE RATES

If we continue to consider only the mortality rate of approximately 10 per 100,000 or the "case" rate of about 50 per 100,000, with an estimate of 500,000 "cases" in the entire country, eradication will never be achieved. The number of deaths and so-called cases being reported annually is not sufficient to insure continuing interest and support of the public in this disease. If the estimate of 500,000 so-called cases were accurate, this figure represents only approximately three-

tenths of 1 per cent of our entire population.

Our sights must be raised and precise aim taken at the tubercle bacillus rather than the gross disease it produces. The only unerring method by which the magnitude of our present and future situation can be determined consists of finding with the tuberculin test those who harbor tubercle bacilli. Although testing has been very limited, particularly among older adults, enough has been done to indicate that approximately 1 person in 3 is now harboring tubercle bacilli. Each of these persons, regardless of apparent good health or clarity of x-ray films of the chest, has areas of disease containing tubercle bacilli. Therefore, in the strict sense of the word, each is a case of tuberculosis, and many who do not already have gross areas of disease will have such lesions evolve before their spans of life are completed. Therefore, we should now inform our citizenry that the case rate is 30,000 per 100,000 of our population. The exact rate for each area can be determined only by testing the entire population with tuberculin. In some counties in the upper midwest where such testing has been done, the case rate has been found to be 22,000 per 100,000. Probably lower rates obtain in other areas and undoubtedly there are sections of states, particularly large cities, with definitely higher rates. Just as we strove through the decades of this century to drive the mortality rate downward from about 200 and the morbidity rate from 2,000 per 100,000, we must now strive to drive downward the case rate of approximately 30,000 per 100,000 population. Our future success must be measured in reductions of this real case rate, and the goal will not be reached in any community or state until no case of tuberculosis is manifested by the tuberculin reaction.

THE INCIDENCE of influenza and accompanying respiratory disorders can be reduced by a wider use of influenza vaccine, according to Thomas Francis, Jr., M.D., School of Public Health, Ann Arbor, Michigan. A properly constituted vaccine of inactive influenza virus is 75 per cent to 95 per cent effective in the prevention of influenza under epidemic or endemic conditions.

Antibody response to influenza is determined by the virus with which an individual is first infected. Therefore, naturally acquired immunity varies with different age groups according to the strain of virus prevalent at different times. Influenza vaccine should be composed of strains of virus selected to provide stimulus to antibody formation against antigens from organisms to which immunity is not likely to have been naturally acquired.

Reactions are few, but the vaccine should not be given to persons sensitive to eggs or chickens.

THOMAS FRANCIS, JR.: *Ann. Int. Med.* 43:534-538, 1955.

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Protein Malnutrition, Proceedings of a Conference in Jamaica (1953), edited by J. C. WATERLOW, 1955. New York City: Cambridge University Press. 277 pages. \$3.50.

This volume is an account of a conference on types of malnutrition seen commonly in those parts of the world where populations subsist on diets grossly deficient in animal protein. The clinical entities called kwashiorkor and V.O.D. (venous occlusive disease) provided the centers of attention, and numerous laboratory and clinical data were presented in connection with these disorders and therapy directed toward their treatment. The panel of experts discussing the problems represented such fields as biochemistry, physiology, pathology, pediatrics, and so forth, and the report is an approximately verbatim account of their deliberations.

There is some doubt as to the wisdom of publishing such a verbatim report. It makes rather tedious reading for one who is looking for the main conclusions rather than the subtler aspects of medical biography and the psychology of medical scientists. A great deal of time and space occupies what most readers will call quibbles, and the book is difficult to scan quickly for its major

BOOK REVIEWS

content. It does, however, contain considerable material on protein malnutrition which is as yet otherwise unpublished, and should interest physicians and research workers who meet that problem.

MAURICE B. VISSCHER, M.D.

• *The Therapy of Skin Tuberculosis*, by GUSTAV RIEHL, M.D., and OSWALD KOPF, M.D. Translated and revised by ERNEST A. STRAKOSCH, M.D., Ph.D. Publication No. 229, American Lecture Series, monograph in Bannerstone Division of American Lectures in Dermatology. Edited by ARTHUR C. CURTIS, M.D. 1955. Springfield, Illinois: Charles C Thomas. 247 pages, 8 illustrations. \$6.75.

This monograph on the treatment of cutaneous tuberculosis is written by European authorities who have

had extensive clinical experience in this field. A major portion of the book is devoted to a discussion of vitamin D therapy. This includes the historic background of its development as well as the treatment technics, indications, and contraindications for its use. In the remaining chapters, the authors discuss their experiences with streptomycin, the various chemotherapeutic agents, such as para-aminosalicylic acid and isonicotinic acid hydrazide as well as physical and surgical methods of treatment.

This is a comprehensive treatise on all phases of skin tuberculosis therapy. It is a valuable addition to the literature in this field and is recommended as a reference work for all dermatologists and others interested in tuberculosis.

ELMER M. HILL, M.D.

• *Cardiac Diagnosis — A Physiologic Approach*, by ROBERT F. RUSHMER, 1955. Philadelphia: W. B. Saunders & Co. 447 pages. \$11.50.

This book is one of the best, if not the best, presentations of the physiology of the normal cardiovascular system. It is divided into five sections that deal successively with the function of the normal cardiovascular

(Continued on page 30A)



SHIRTS

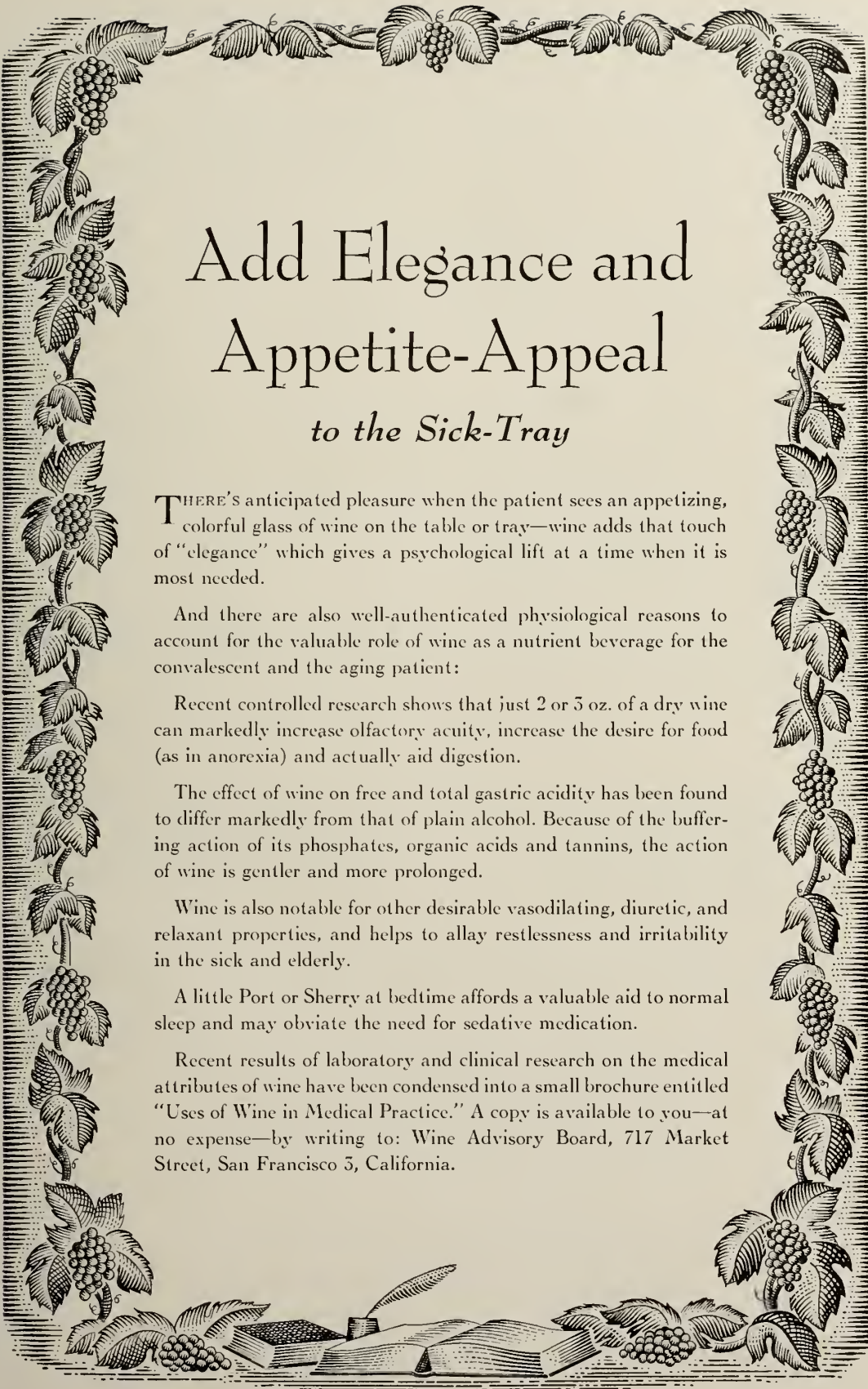
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Recent controlled research shows that just 2 or 3 oz. of a dry wine can markedly increase olfactory acuity, increase the desire for food (as in anorexia) and actually aid digestion.

The effect of wine on free and total gastric acidity has been found to differ markedly from that of plain alcohol. Because of the buffering action of its phosphates, organic acids and tannins, the action of wine is gentler and more prolonged.

Wine is also notable for other desirable vasodilating, diuretic, and relaxant properties, and helps to allay restlessness and irritability in the sick and elderly.

A little Port or Sherry at bedtime affords a valuable aid to normal sleep and may obviate the need for sedative medication.

Recent results of laboratory and clinical research on the medical attributes of wine have been condensed into a small brochure entitled "Uses of Wine in Medical Practice." A copy is available to you—at no expense—by writing to: Wine Advisory Board, 717 Market Street, San Francisco 3, California.

BOOK REVIEWS

(Continued from page 28A)

lar system, regulation of the cardiovascular system, congestive heart failure, methods of cardiac diagnosis, and, finally, the diagnosis of cardiac disease. For the person interested primarily in the physiologic aspects of the cardiovascular system and in the methods of studying the physiology of the cardiovascular system, this book can be highly recommended.

From the point of view of cardiac diagnosis, much is left to be desired. The physician who purchases this book with the idea that it is a discourse in diagnostic cardiology is

certain to be disappointed. The relatively small portion of the book devoted to the actual diagnosis of cardiac disease deals with only a limited section of the entire spectrum of heart disease. No discussion whatsoever is included of pericardial or hypertensive disease, and those diseases that are covered are done so from the physiologic rather than the clinical point of view.

Certain defects in the presentation mirror the author's particular interests in cardiac physiology. He devotes an unusual amount of space to the work done by his group on measurements of intraventricular pressures and ventricular diameter

and circumference of the experimental animal. This is also reflected in a discussion of heart sounds and murmurs in which the standard phonocardiography has been more or less replaced by a presentation of graphic records of sound intensity.

The illustrations are profuse and unusually clear. The purchase price of \$11.50 seems to be quite reasonable for a book of this magnitude. For the person interested in a modern presentation of cardiovascular physiology, it is probably the best currently available. For the person interested primarily in practical cardiology, it is of limited value.

PAUL WINCHELL, M.D.

American College Health Association News . . .

The thirty-fourth annual meeting of the American College Health Association will be held in Minneapolis at the Nicollet Hotel May 17 through 19. Arrange your schedule now so you can be there. If you have not already sent in your reservations do so immediately. A splendid meeting is in prospect.

• • • •

Bowling Green State University, Bowling Green, Ohio, is seeking an experienced health service physician to direct its program and have complete charge of its

Health Service and Infirmary. The school is coeducational with about 7,000 students. Anyone interested should write to Dr. Elden Smith, director of student services, Bowling Green State University.

• • • •

Dr. Charles E. Lyons will head the student health program at the Agricultural and Mechanical College of Texas, College Station, Texas. Dr. Lyons has been health officer at Virginia Polytechnic Institute, Blacksburg, Virginia.

MEDICAL ABSTRACT NO. 489

FROM THE LIBRARY OF
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Hypertension

EACH TABLET CONTAINS

FILE RE: **VERAPENE**

Reserpine0.1 mg.

Protoveratrine A and B.....0.4 mg.

Wilkins, R. W., and Judson, W. E.: New England Jrl. of Medicine 248:48, 1953

"*Rauwolfia serpentina*, when given alone has duplicated essentially the results reported by others, and when given in conjunction with other hypotensive agents, notably hydrazinophthalazine, or *Veratrum viride*, has appeared to exert a remarkable additive, if not synergistic hypotensive effect."

Wilkins, R. W.: Mississippi Doctor 30:359, 1953

"Combinations of drugs for the treatment of essential hypertension are more effective than any one drug alone."

HENRY K. WAMPOLE & CO., INCORPORATED PHILADELPHIA 23, PA.

News Briefs . . .

North Dakota

DR. ROBERT J. ULMER, specialist in internal medicine, has become associated with the Dakota Clinic at Fargo. Dr. Ulmer previously served in the army and air force medical corps and did postgraduate work in internal medicine at the University of Texas Hospital, Galveston.

DR. JOHN M. HEWITT, former radiologist at Columbus Hospital, Great Falls, Montana, has joined the DePuy-Sorkness Clinic at Jamestown in the department of diagnostic and therapeutic x-ray.

DR. GEORGE C. HENDRICKSON, a member of the medical service staff of Veterans Administration at Ft. Snelling in Minneapolis for ten years, has been appointed to the Veterans Administration Center's medical staff at Fargo.

DR. NICHOLAS G. BOOSALIS, former Faribault physician, is the newest addition to the medical staff of the Veterans Administration Hospital in Minot. The hospital now has 4 full-time doctors. Dr. Boosalis has also been associated with the Veterans Administration at Sioux Falls, South Dakota, and has served as assistant clinical professor of surgery at the University of South Dakota Medical School.

DR. H. B. WAYDEMAN, who practiced in Hunter for the past five years, recently opened an office in the clinic building in Hope. Until his arrival, the people of Hope and the surrounding territory had been without the services of a physician for some time.

DR. MURRAY CAMERON, formerly of Winnipeg, is the

new resident physician in Kuhn. Since his arrival, the Kuhn Community Health Center has been able to operate on a full-time schedule. Dr. Cameron is also a member of the Ellendale Clinic.

DR. M. J. TOWARNICKY, who is teaching at present at the University of Manitoba, plans to start practice in Fessenden in June, according to the Fessenden Medical Center Committee.

Minnesota

THE RAPPAPORT PROFESSORSHIP in cardiac research was recently established by the University of Minnesota regents. A proposal of the Mount Sinai Hospital board of governors to use a gift of \$10,000 a year from the Rappaport family for the new research position was approved. An initial gift of \$55,000 has been made as a memorial to the late Edward Rappaport. The research professor, to be announced later, will do most of his work at the Jay Phillips Research Laboratory at Mount Sinai Hospital.

DR. HENRY W. MEYERDING and DR. WILLIAM MCCARTHY, on the staff of the Mayo Clinic, have been named to the International Executive Council of the International College of Surgeons.

DR. JOHN S. PEARSON, clinical pathologist at the Rochester State Hospital, was elected president of the newly organized Minnesota Council for the Gifted. Dr. Pearson, who is also president of the Minnesota Genetics Society, emphasized the need for special opportunities to stimulate superior achievement and understanding of the gifted child.

DR. CECIL J. WATSON, head of internal medicine at the

(Continued on page 32A)

MEDICAL ABSTRACT NO. 501

FROM THE LIBRARY OF
WAMPOLE LABORATORIES

Hypertension

EACH TABLET CONTAINS

FILE RE: **VERAPENE**

Reserpine0.1 mg.
Protoveratrine A and B.....0.4 mg.

Wilkins, R.W.: Medical Clinics, North America 37:1303, 1953

"Rauwolfia is certainly a valuable addition to our armamentarium against hypertension, not so much because it is a powerful or striking hypotensive agent... as because it is our most effective symptom reliever, and because it acts very well with other more powerful drugs."

Duncan, Garfield G.: Philadelphia Medicine 51:24, 1956

"Either 1.0 mg. of the (Rauwolfia) alkaloid or 100 mg. of the crude root each evening or b.i.d. may suffice, but if the hypertension is not adequately controlled, Veratrum viride may be added."

HENRY K. WAMPOLE & CO., INCORPORATED PHILADELPHIA 23, PA.

NEWS BRIEFS

(Continued from page 31A)

University of Minnesota, is the new president of the Minnesota chapter of the Arthritis and Rheumatism Foundation. Dr. Watson succeeds Dr. Charles Slocumb.

DR. HERMAN E. DRILL has been elected the new president of the Hennepin County Medical Society. Dr. Karl E. Sandt was elected first vice president; Dr. W. W. Rieke, second vice president; and Dr. Charles Aling and Dr. Thomas J. Kinsella, members of the board of directors.

DR. A. E. RITT is the new president of the Ramsey County Medical Society. Dr. E. C. Gibbs is secretary-treasurer, and Dr. J. Allen Wilson is president-elect.

DR. LLOYD F. SHERMAN has been elected chief of staff of St. Barnabas Hospital, Minneapolis. Other officers include Dr. William T. Walsh, vice chief; and Dr. John T. Moehn, re-elected secretary-treasurer.

DR. WESLEY H. BURNHAM has been elected chief of staff of Swedish Hospital, Minneapolis, to succeed Dr. Robert Quello. Other officers include Dr. Roy A. Lundblad, vice chief; and Dr. John H. Linner, re-elected secretary-treasurer.

DR. IRVING C. BERNSTEIN has been re-elected chief of staff of Glenwood Hills Hospital, Minneapolis. Other officers elected were: vice-president, Dr. Robert L. Meller; and secretary-treasurer, Dr. Donald Daggett.

DR. JOHN SCHMID has been elected chief of staff of Miller Memorial Hospital, Duluth. Dr. Schmid succeeds Dr. Frederick Becker. Other officers are: vice chief of staff, Dr. Kenneth Teich; secretary of staff, Dr. Kenneth K. A.

Storsteen; and member of the executive committee, Dr. John Dwyer.

DR. ARDEN L. ABRAHAM, radiologist, has been chosen chief of staff of St. Luke's Hospital, Duluth. Dr. Abraham succeeds Dr. M. F. Fellows. Dr. P. N. Bray was named chief-elect.

DR. JOHN CAMERON has been named president of Bethesda Hospital, Crookston, succeeding Dr. H. M. Wikoff. Other officers are: vice-president, Dr. William Downing; and secretary, Dr. John Jensen.

DR. URBAN H. ZEE, a graduate of Creighton University Medical School, has opened an office in Mankato. He is confining his practice to diseases and injuries of bones and joints and reconstructive surgery.

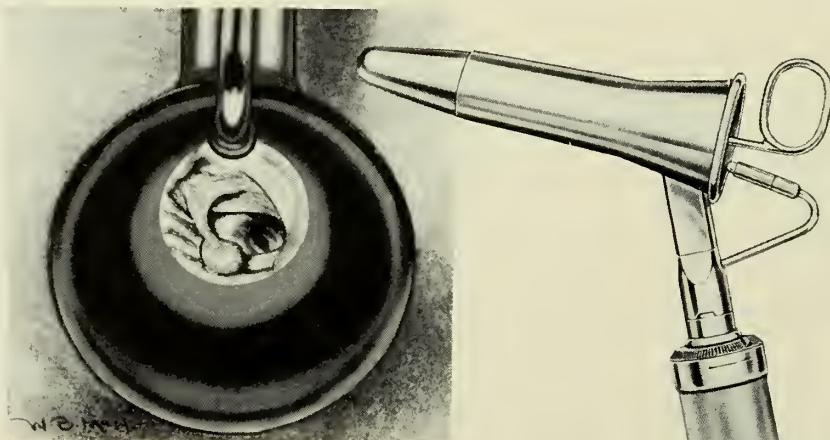
DR. PERRY ENGSTROM has become associated with Drs. E. J. Beithon, D. G. Jaehning, and Paul J. Beithon at the Red River Valley Clinic, Breckenridge. Dr. Engstrom's specialty is surgery. His previous experience includes teaching pediatric surgery at Children's Hospital and gynecologic surgery at Allegheny General Hospital, Pittsburgh.

DR. ALLEN ZEMPEL, a graduate of the University of Nebraska College of Medicine, recently became associated with Dr. Bucher in Starbuck. Dr. Zempel formerly practiced in San Diego, California and Burwell, Nebraska.

DR. H. K. HELSETH, who has practiced in Pelican Rapids since 1950, has joined the staff of the Fergus Falls State Hospital.

DR. THOMAS W. MILROY, previously in private practice

(Continued on page 35A)



Anorectal pathology is quickly brought to light with WELCH ALLYN ANOSCOPES

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NEWS BRIEFS

(Continued from page 32A)

in Winnipeg and associated with the clinic there, has joined the Lenont-Peterson Clinic in Virginia as obstetrician and gynecologist.

DR. S. A. SLATER has resigned after thirty-six years as superintendent of the Southwestern Minnesota Sanatorium, Worthington, at the age of 71. Credited with inaugurating the first general testing program to seek out tuberculosis sufferers in a 12-county Minnesota area in 1919, Dr. Slater has worked with tuberculosis patients since 1909.

DR. BALDWIN B. BORRESON, superintendent of Sunnystre Sanatorium at Crookston for the past year, has resigned his position because of ill health. Dr. Borreson had previously served as superintendent of Oakland Park Sanatorium in Thief River Falls for about twenty years.

South Dakota

DR. JOHN H. FODDEN, associate professor of pathology at the University of South Dakota School of Medicine, is the second member of the faculty to receive a Lederle medical faculty award. Dr. Fodden left in February to study advanced research techniques in London, Denmark, and Sweden. His award of \$6,500 for teaching and research in diabetes and factors of diabetic metabolism will be available upon his return. About a year ago, Dr. Frances O. Kelsey, professor of medicine, received a Lederle award of \$22,500 for a three-year period of teaching and research in physiology and pharmacology.

DR. CHARLES R. PRICE has established practice in Salem. His previous practice included several years in California; four years in Orient, South Dakota; and four years in Hot Springs, South Dakota.

DR. F. E. BOYD has reopened his medical practice in Flandreau after an absence of five years. Obstetrical cases are not included in his practice.

DR. HUGH LAMASTER has become associated with Dr. Charles E. Baker in the Tri-State Clinic at Belle Fourche. After an internship at Clarkson Hospital, Omaha, Dr. LaMaster practiced in Iowa and Nebraska.

Deaths . . .

DR. EDWARD G. NICHOLSON, 80, pioneer physician of Lawton, North Dakota, died January 20. Dr. Nicholson served the people of Lawton and the surrounding area for more than fifty years.

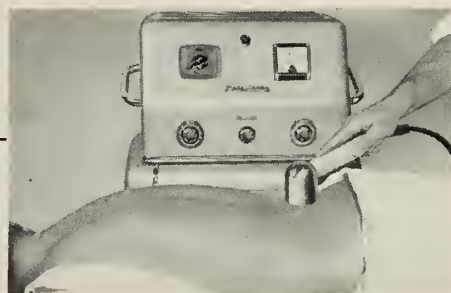
DR. DAVID M. POTEK, 51, of Minneapolis, died early in January. Dr. Potek was stricken while on duty at the Cambridge State Hospital, Cambridge, Minnesota.

DR. RICHARD CHARLES ADAMS, 49, a member of the staff of the Mayo Clinic since 1937, died January 21. Dr. Adams was appointed an instructor in anesthesiology in the Mayo Foundation in 1940. He was promoted to assistant professor in 1945, and to associate professor in 1948. In 1952 and 1953, he was head of the Section of Anesthesiology at the Mayo Clinic. He was widely known for his work in the field of intravenous anesthesia and his investigations on curare as applied to anesthesia.

DR. WALTER UDE, 59, Minneapolis radiologist, died

(Continued on page 36A)

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- Large area crystal provides full cylindrical output pattern
- Resonance control for positive tuning
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Available in either console or portable models. Ask for a demonstration or write for complete literature . . . JL-456.

Physicians & Hospitals Supply Company

MINNEAPOLIS 3, MINNESOTA

NEWS BRIEFS

(Continued from page 35A)

February 10 of a heart attack while vacationing in Hawaii. He was a senior partner in the firm of Ude, Borman, Ahern & Stone, Radiologists. Dr. Ude was also clinical professor of radiology at the University of Minnesota and was recently elected vice president of the Radiological Society of North America.

DR. ALLAN F. GIESEN, 52, family physician to most of the residents of Starbuck, Minnesota for many years, died January 26. A 1925 graduate of the University of Minnesota Medical School, Dr. Giesen interned at Anchor Hospital, St. Paul, and after two years of postgraduate work at Detroit, Michigan, began practice in Starbuck.

DR. ALBERT H. BISHOP, 83, former physician of Lamberton, Minnesota, died January 18. Dr. Bishop practiced in Dunnell, Minnesota, for about twenty years before establishing practice in Lamberton. Upon his retirement about two years ago, he returned to Dunnell.

TUBERCULIN TESTING PROGRAM IN NORTH DAKOTA SCHOOLS

(Continued from page 111)

In the tuberculin patch-testing program in St. Louis County schools, of the first 15,755 students who had patch tests, 658 showed positive reactions. Of 1,395 children with reactions and contacts who had roentgenograms made, 13 proved to have active cases of tuberculosis and 12 more were suspected of having it. He found that the most patent sources of active tuberculosis are among grandparents and older baby sitters.

CONCLUSIONS

The American School Health Association Program for tuberculin testing in schools is being followed in North Dakota with excellent results.

As the result of the first 23,089 pupils tested, 11 active cases of tuberculosis were found. This program indicates the tuberculosis problem in different areas of the state. The program has tremendous educational value. By following positive reactors to the home, the sources of infection are frequently found.

REFERENCE

GRAY, WALTER C.: Mass tuberculin patch testing of school children. J.A.M.A. 158:8-10, 1955.

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For displasia of the hip in the newborn and in early postnatal life (as described by Dr. V. L. Hart, Journal of Bone and Joint Surgery, Vol. 31-A, pp. 357-372, April, 1949).

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SMALLER DOSAGE:

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COMING in *June* . . .

Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.

- Instabilities resulting from fear, anxiety, and other emotions play an important role in poliomyelitis. Few diseases create more panic than this dread condition. "Anxiety Tension States in Poliomyelitis" by George J. Boines, M.D., of Wilmington, Delaware, outlines a therapeutic program which considers not only care of the patient but also socio-economic factors and the psychologic preparation of the family. Success of such a program rests primarily on the general practitioner, since the patient's physical, social, and psychologic adjustment depends largely on his proper guidance and understanding.

- Diagnosis of adrenocortical insufficiency depends primarily on clinical observation. A study of 16 such cases occurring in infants is presented in "Adrenocortical Insufficiency in Infants - Diagnostic Features" by Theodore C. Panos, M.D., of Galveston, Texas. A clinical picture characteristic of a syndrome appeared in the majority of patients. Diagnosis was made most often by demonstration of pathognomonic serum electrolyte changes in the presence of the following typical features: (a) onset in the first week of life, (b) persistent dehydration, (c) failure to gain weight, (d) vomiting, (e) polydipsia and polyuria, (f) occasional diarrhea, and (g) development of anorexia and listlessness.

- The majority of human beings who have been infected with avian tubercle bacillus have been reported from western Europe. Most of these cases occurred in areas in which avian infection is common among poultry. "Avian Tuberculosis in Man" by John T. Kelly, a member of the 1956 graduating class at the University of Minnesota, reviews the literature covering the symptomatology, incidence of infection, and diagnosis of this disease.

- In *LANCET Clinical Reviews*, a case of a patient with "Hypertension and Unilateral Renal Disease" is reported by M. P. Reiser, M.D., and C. D. Creevy, M.D., of the division of urology in the department of surgery at the University of Minnesota. In this case, two and one-half years after nephrectomy, no episodes of cardiac failure had occurred, electrocardiograms were normal, and retinal hemorrhages had disappeared. Nephrectomy is contraindicated in many instances of hypertension, and an improper selection of patients often accounts for the low percentage of cures.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA POSTGRADUATE COURSES

A course in Electrocardiography for General Physicians will be given May 7 to 12.

A course in Proctology for General Physicians will be held May 14 to 19.

A course in Surgery for Surgeons will be given May 24 to 26.

A course in Dermatology for General Physicians will be presented June 4 to 6.

CHEST PHYSICIANS TO MEET

The annual meeting of the American College of Chest Physicians will be held at Hotel Sherman, Chicago, June 6 through 10. In addition to formal presentations, the program will include several symposia, round table luncheon discussions, seminars, and motion pictures.

SHORT COURSES IN PEDIATRICS

The following courses will be conducted during May and June at Children's Hospital, Philadelphia. (1) Pediatric Advances for Pediatricians and General Practitioners, May 28 through June 1. Tuition \$100. (2) Practical Pediatric Hematology, June 4 through 6. Tuition \$60. (3) Blood Group Incompatibilities and Erythroblastosis Fetalis, June 7 and 8. Tuition \$50.

TUBERCULOSIS SYMPOSIA

The annual symposium for General Practitioners on Tuberculosis and other Chronic Pulmonary Diseases will be held at Saranac Lake, New York, July 9 to 13. Many of the sessions will be informal discussions with ample opportunity for questions. Registration fee is \$40. Further information can be obtained from Dr. Edward N. Packard, General Chairman, P.O. Box 262, Saranac Lake, New York.

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The facilities of the Harley E. French Library at the University of North Dakota are available to all physicians and auxiliary medical personnel of North Dakota. Books and journals may be obtained by writing Miss Loretta Swift, Librarian.



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and natural laxation without catharsis prevents colonic dehydration⁴ and biliary constipation—acts as a "...physiologic stimulant to evacuation...."⁴

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(1) Crenshaw, J. F.: *Am. J. Digest. Dis.* 17:387, 1950. (2) Lichtman, S. S.: *Diseases of the Liver, Gallbladder and Bile Ducts*, ed. 3, Philadelphia, Lea & Febiger, 1953, vol. 2, p. 951. (3) Sherlock, S.: *Diseases of the Liver and Biliary System*, Springfield, Charles C Thomas, 1955, p. 642. (4) King, J. C.: *Am. J. Digest. Dis.* 22:102, 1955.



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Osteoid Osteoma

GEORGE M. HART, M.D.

Minot, North Dakota

OSTEOID OSTEOMA is a painful, benign lesion of bone, amenable to surgery, occurring most frequently in adolescents and young adults. The term osteoid osteoma was introduced by Jaffe¹ in 1935 when he noted that the lesion was a new type of benign neoplasm of bone which had previously been unclassified. He listed 7 characteristics typical of the affliction: (1) the patients were all adolescents or young adults from 11 to 22 years old; (2) the presenting complaint was pain in the region of the lesion, which usually interfered with sleep; (3) the lesion was located in an area of spongy bone, and, although it occasionally involved cortical bone, the periosteum was never penetrated; (4) roentgenologically the growths were more or less round, circumscribed, and confined within the bone; (5) all of the lesions were small, ranging from 0.5 to 2 cm. in diameter; (6) although the lesions were operated upon with the assumption that the condition was inflammatory, no evidence of infection was found in any case, and (7) complete excision of the lesion resulted in permanent and complete relief of all symptoms.

Several reports are found in the literature describing lesions typical of osteoid osteoma in which, however, the author failed to recognize the lesion as a distinct entity. Heine² in 1927 reported a lesion in the proximal phalanx of the ring finger. Hitzrot³ in 1929 presented a case involving the carpal scaphoid, entitling his ar-

ticle, "Sclerosing Osteomyelitis of the Carpal Scaphoid." Bergstrand⁴ reported 2 cases in 1930, 1 involving a metatarsal and the other the phalanx of the finger. Both of these lesions were clinically diagnosed as osteogenic sarcoma, and amputation of the finger and resection of the metacarpal were done. Milch⁵ described 3 cases similar to Bergstrand's in 1934 and stated that the involvement was probably a benign osteoblastic tumor forming osteoid tissue which should be treated by surgical excision.

ETIOLOGY

Considerable controversy appears in the literature regarding the exact nature of the process. Most investigators recognize osteoid osteoma as a distinct entity but disagree whether the lesion is inflammatory or neoplastic. Brown and Chormley⁶ in 1943 and Hellner⁷ in 1950 stated that the lesion was nothing more than a form of bone abscess. Bergstrand, a pathologist, felt that the lesion was derived from an islet of embryonic tissue. Jaffe introduced and supports the concept of neoplastic origin. In his excellent article in 1935, he reviewed the various etiologic possibilities extensively. In disagreement with those supporting the inflammatory origin theory, Jaffe noted that in none of the reported cases was there microscopic indication of suppuration, granulation tissue, or necrotic bone. Regarding possible origin from an embryonic rest, he stated that simple rests in bone do not give rise to clinical symptoms. Furthermore, the type of rest

GEORGE M. HART is consultant in orthopedic surgery at Veterans Hospital, Minot; on the staffs of Trinity Hospital and the Northwest Clinic, both in Minot; and surgeon for the Soo Line Railroad.

From the department of orthopedics, Northwest Clinic, Minot, North Dakota.

most apt to be found in bone is cartilaginous, and no traces of cartilage have been found in any of the reported cases. He considered the possibility that the condition might be an unfamiliar healing stage of giant cell tumor or cyst, but noted that the highly vascular spindle-cell stroma associated with multinucleated giant cells was lacking. Regarding the neoplastic nature of the lesion, Jaffe states, "One feels forced to conclude here that one is dealing with a benign bone neoplasm, the distinctiveness of which has not hitherto been recognized and which I am designating 'osteoid osteoma'." He felt that the tumor arose from osteoblastic mesenchyma forming large amounts of osteoid tissue which became calcified to form atypical new bone. When trabeculae form in this stroma, the lesion remains highly cellular, containing numerous osteoblasts but no hematopoietic marrow or fat marrow. Jaffe further stated that benignity of the tumor was evidenced in several ways. The growth never perforates the periosteum or infiltrates the soft tissue in the vicinity of bone and is always surrounded by encapsulating bone. Most important, there is no tendency for recurrence if excision is complete and metastases do not occur.

Sherman⁸ in 1947, in reporting 2 cases of osteoid osteoma associated with changes in the adjacent joints, supported Jaffe's contention that this kind of bone involvement is not an infectious process. She noted that although both of her patients had symptoms and findings typical of primary arthritis, neither had systemic findings suggestive of infection nor was chemotherapy effective. Sections of synovial membrane removed showed only nonspecific inflammatory changes. After excision of the osteoid osteoma, the acute joint symptoms promptly subsided and did not return. In an article in 1947, Sherman⁹ further notes that in cases reported in the literature in which positive cultures have been obtained, the organism has usually been a staphylococcus albus or some other common contaminant. As further proof against a possible infectious origin, she states that the lesions are always solitary, never recur after complete excision, and that the resulting wounds invariably heal by first intention.

Golding¹⁰ in 1954, who supported the neoplastic theory of origin, postulated a theory to explain the severe pain typical of the lesion. He said that microscopic sections made through the nidus and surrounding bone, when examined under polarized light, revealed trabeculae extending in a radial arrangement from the central focus to merge at the periphery with the normal surrounding trabecular pattern. He interpreted this radial arrangement as evidence of central

pressure occurring in the nidus, presumably because of its vascular nature. He concluded that pain was produced by the highly vascular tumor lying within the confines of the sclerosed bony trabeculae.

CLINICAL FINDINGS

Osteoid osteoma occurs most frequently in the second and third decades of life. In Sherman's⁹ review of the literature in 1947, over half of the reported cases were in patients between the ages of 10 and 20. Over half of the 30 cases presented by the author were in patients between the ages of 5 and 15. Sankaran¹¹ reported 32 cases in 1954 in which the average age incidence was 11.8 years. His youngest patient was 19 months old and the oldest was 33 years. Males are somewhat more commonly affected than females. Of 127 cases reported in the literature in which sex was given, as reviewed by Sherman⁹ in 1947, 87 occurred in males. Of her 30 cases, 20 were in males. Of the 32 cases presented by Sankaran, 27 were in males. In Sherman's review of the literature in 1947, only 1 case had been reported in a Negro.

The lesion occurs most frequently in the shafts of the long bones, particularly of the lower extremities. The tibia is most frequently involved, followed by the lower two-thirds of the femur. Phalen¹² noted in 1954 that every bone in the body has been described as the site of occurrence except the skull. The spine was involved in 25 per cent of Sherman's⁹ 30 patients. In 1954 Cameron¹³ reported a patient with involvement of the dorsum of the sacrum.

The chief clinical complaint of patients with osteoid osteoma is pain. The pain begins gradually and intermittently, becoming constant and severe. It is usually worse at night and often prevents sleep or awakens the patient in the middle of the night. The pain may precede the roentgen appearance of the lesion by months. Salicylates typically afford considerable relief. Usually the pain is located directly over the site of the lesion but in some cases is referred to adjacent joints. There are no general symptoms, such as fatigue, malaise, or weakness.

When a long bone is involved, moderate swelling of the soft tissues at the level of the tumor often occurs. Typically, acute point tenderness is present over the lesion which the patient is able to localize accurately. There is no increased heat or redness indicating inflammation. There may be some atrophy of the muscles of the involved extremity. When a bone of the lower limb is affected, a limp may occur. Fever, leukocytosis, and enlargement of regional lymph

glands are not typical. However, Jackson¹⁴ has reported cases with slight leukocytosis and enlargement of neighboring lymph nodes.

PATHOLOGY

Typically, osteoid osteoma consists of a small round or oval nidus containing osteoid tissue and irregular scattered newly-formed bone trabeculae. The central nidus is usually about 1 cm. in diameter and is surrounded by dense sclerosis which may make its detection difficult roentgenologically. Sankaran has noted that the only other lesion which produces a comparable osteosclerosis is an intracranial meningioma.

Grossly, the first appearance of an osteoid osteoma upon exposing the involved bone is an area of cortical thickening. The bone is dense and hard when cut with an osteotome and tends to splinter. The nidus lies in a distinct cavity in the center of the surrounding sclerotic bone and is adherent at the edges. It appears vascular and is usually brownish-red in color. Its consistency is firm, and numerous gritty particles of new bone formation are present in its substance. The overlying periosteum is occasionally thickened. The surrounding sclerotic bone contains many vascular spaces and usually bleeds rather freely.

Microscopically, the lesion appears vascular and is pale pink in color because of the abundant osteoid tissue. The stroma is of connective tissue containing many osteoblastic cells. Irregular calcified trabeculae of new bone appear scattered throughout the osteoid tissue. Occasional plasma cells and osteoclasts are present. Sankaran noted lymphocytic infiltration of the overlying periosteum in 2 of his cases. In 1 of these patients in whom he biopsied adjacent muscle, lymphocytic infiltration which suggested myositis was present.

Changes in neighboring joints have been noted by several authors.^{8,12} Sherman⁸ reported a lesion involving the femoral neck with pronounced villous proliferation of the synovial membrane of the hip joint and some marginal osteophyte formation about the head of the femur. The joint space contained about 100 cc. of clear, xanthochromic fluid. As the patient was only 16 years old, the associated changes were probably caused by the lesion. Phalen also reported a case involving the inferior aspect of the neck of the femur where the synovium of the hip joint was thickened, and an increased amount of fluid was present within the joint. Microscopic examination of the joint synovium revealed chronic nonspecific inflammatory changes.

Fagerberg¹⁵ noted that 2 forms of osteoid os-

teoma may be distinguished according to the site of occurrence. Usually the diaphysis of a long bone is involved which contains a central nidus with surrounding pronounced cortical sclerosis. However, when short or flat cancellous bones are involved, the central nidus is often larger and more opaque, and the surrounding sclerosis may be absent or minimal.

A new form of osteoid osteoma was reported in 1954 by Dahlin and Johnson.¹⁶ They designated the lesion "giant osteoid osteoma." Distinguishing this entity from the smaller type, they noted that the nidus was larger, varying from 2.5 to more than 5 cm. in diameter. Microscopically, the tissue appeared more vascular and contained a more orderly pattern of large osteoid trabeculae. A tendency to erode through the cortex of the overlying bone was noted, and surrounding bony sclerosis was somewhat more inconstant than in the usual type of osteoid osteoma. Grossly, the tumors were softer and more hemorrhagic in character. Microscopically, the lesions revealed osteoid tissue showing varying, usually slight, degrees of calcification. The spaces between osteoid trabeculae were filled with dilated capillaries and occasionally blood-filled spaces without recognizable walls.

ROENTGEN FINDINGS

Typically, osteoid osteoma presents a picture of dense osteosclerosis with a central round or oval nidus of decreased density ranging in size from 0.5 to 1.5 cm. Irregular foci of calcification are frequently present in the nidus. The latter may be located in the cortical bone, occasionally within the medullary canal, and less often subperiosteally. When the lesion lies in cancellous bone, sclerosis is less evident.

When the diaphysis of tubular bones is involved, cortical sclerosis is fusiform in outline. The cortex is frequently thickened, both on the medullary aspect and subperiosteally. The medullary canal may be completely or partially obliterated. The centrally located nidus usually has a rather indefinite margin and appears somewhat blurred.

In spongy bone, the surrounding sclerotic bone reaction is considerably less pronounced and may be entirely lacking. The nidus is more spherical and is of varying density, often appearing more opaque in its center. The lesion is usually located adjacent to the cortex of the involved bone.

Carroll¹⁷ has noted that the nidus may rarely occupy a periosteal location in which the periosteum is elevated by the central growth. A thin layer of osseous tissue may cover the nidus, and

the underlying cortex may become quite sclerotic. Occasionally, little or no sclerosis is present.

DIFFERENTIAL DIAGNOSIS

A number of entities must be differentiated from osteoid osteoma. Bone abscess must be considered most frequently. In this defect, cortical thickening is usually less prominent about the central lesion and is localized about the immediate periphery of the area of decreased density. In osteoid osteoma, the cortical thickening is more fusiform and tends to be proportional to the size of the nidus. In syphilitic osteitis, the central area of decreased density is more uneven and is usually longer in one diameter than the other. The central tumor in xanthoma of bone is larger and more irregular than in osteoid osteoma. Cortical thickening is frequently absent and, when present, is much thinner and localized immediately about the periphery of the central growth. Thickening of the cortex of the involved bone is not increased nor is the medullary canal narrowed. Pathologic incomplete fractures may occur with xanthomas but do not occur with osteoid osteomas preoperatively.

Eosinophilic granulomas may be confused with osteoid osteomas, but the former are larger, often multiple, and do not have the typical surrounding bony sclerosis. Sclerosing osteomyelitis of Garré may closely simulate osteoid osteoma but usually does not affect a central area of bone as the latter typically does. Brodie's abscess may be similar in appearance and the diagnosis may rest upon operative findings. Tuberculosis of bone, when occurring in a metacarpal or phalanx, may present an appearance similar to osteoid osteoma.

COMPLICATIONS

A study of the literature indicates that no complications are related to osteoid osteoma per se. The tumor is benign and in all recorded cases remains so. The indication for surgical removal is relief of the severe pain which most patients experience.

However, one complication does exist, after surgical extirpation. Pathologic fracture in the region of an excised nidus may occur if too much of the surrounding sclerotic bone is removed. Attention has been called to this possibility by several authors,^{11,12} and one of the patients presented in this series sustained such a complication three months after operation.

As noted by Sherman,⁹ postoperative infection is rare; the wounds heal by first intention in most instances. Synovial changes in joints adjacent to bone involvement have been discussed.

TREATMENT

The treatment of osteoid osteoma is surgical excision of the central nidus. A sufficient amount of the surrounding sclerotic bone should be included to insure adequate removal of the nidus, but, as has been noted previously, pathologic fracture may occur if an excessive amount of the cortex is removed. The insertion of one or two guide wires at operation followed by a roentgenogram of the area aids considerably in localizing the nidus.

As noted by Golding, curettage of the central cavity is not advisable; only complete removal safeguards against its possible recurrence.

Treatment with antibiotics has been unsuccessful, according to Carroll.

PROGNOSIS

The prognosis after adequate surgical excision of the nidus in osteoid osteoma is good. In reviewing the literature, it is evident that all authors report dramatic and often immediate postoperative relief of the severe pain. Furthermore, the relief of symptoms is lasting, and, except for an occasional pathologic fracture after excessive excision of bone, complications are nonexistent.

It is the general consensus of opinion^{9,12,18} that osteoid osteoma heals spontaneously over a period of years even if not treated surgically. Such a case is included in this paper. Surgical treatment, however, is usually preferred by the patient for relief of severe pain.

CASE REPORTS

Case 1. Mrs. R. M., age 29, was first seen in the orthopedic section of the Northwest Clinic on January 28, 1954. She complained at that time of pain in the left shoulder and arm of eight months' duration. She had fallen on her back ten years previously and afterward pain, swelling, and soreness developed over the posterior left shoulder radiating to the anterior upper left chest for one month. A similar attack of pain occurred several months later which lasted three weeks. In the three years prior to examination, she had experienced several similar attacks of pain. In May 1953, she awoke one morning with pain in the left mid-arm and shoulder which gradually increased in intensity until the time of her examination here. The pain was aggravated by use of the arm as in hanging up clothes and became worse at night.

Examination revealed grade II tenderness over the neck of the left humerus. Motion in the shoulder was normal and not painful. No atrophy of the shoulder muscles was noted. Grade III tenderness was present over the under surface of the left scapula and also along the lower one-third of the left triceps.

X-ray examination of the left shoulder revealed an area of decreased density in the neck of the humerus surrounded by bony sclerosis (figure 1).

On February 24, 1954, the lesion in the neck of the left humerus was excised. Immediate postoperative relief of pain was experienced in the region of the left



Fig. 1. Roentgenogram of left shoulder of case 1. A central area of rarefaction surrounded by bony sclerosis is present in the surgical neck of the humerus.

shoulder and scapula. Microscopic examination of the nidus revealed a typical osteoid osteoma (figure 2).

Upon examination September 10, 1954, the patient was found to be free of pain, and motion of the left shoulder was not limited.

Case 2. D.L., a 14-year-old girl, was seen November 6, 1950, because of pain in the anterior left thigh of six weeks' duration. The pain began gradually as an ache in the lower third of the femur. It became worse at night and better during the day when she was up and about. Occasionally, it was severe enough to awaken her from sleep and often prevented her from falling asleep after retiring. The patient was able to localize the pain accurately deep within the lower third of the left thigh.

Examination revealed a tender swelling palpable over the anterolateral surface of the midshaft of the left femur. Motions of the hip and knee were normal. Cir-

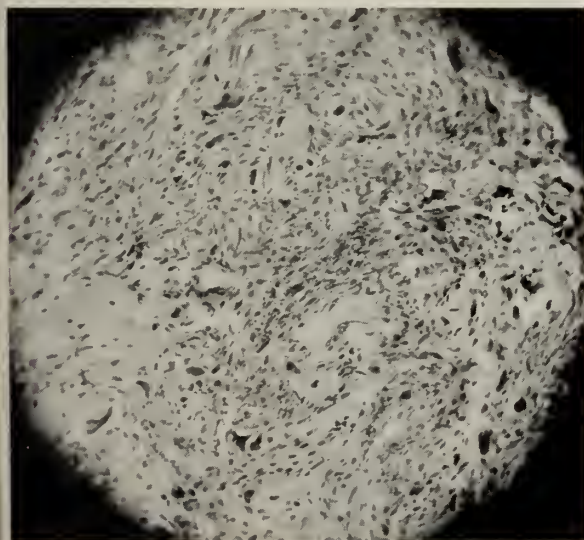


Fig. 2. Photomicrograph through section of nidus of case 1 showing connective tissue stroma, osteoid tissue, irregular trabeculae of new bone formation, and osteoclasts typical of osteoid osteoma.

cumference of the left thigh 15 cm. above the patella was 39 cm. as compared with 41 cm. on the right.

X-ray examination of the left femur revealed thickening of the anterolateral cortex of the mid-third of the bone in the center of which a small rarefied nidus was visible.

The patient was operated upon November 8, 1950, and the central nidus with a portion of the surrounding bony sclerosis was excised (figures 3 and 4). Postoperatively the pain was relieved and convalescence was uneventful.

Examination on September 4, 1951, revealed normal motion in the left hip and knee. The patient walked without limp and was free of pain.

Case 3. S.B., a 29-year-old man, was seen July 28, 1955, with the complaint of pain in the right shoulder and upper arm of nine months' duration. He had previously been seen in the orthopedic section of the Northwest Clinic on March 4, 1948, complaining of pain in the same shoulder of two weeks' duration. X-ray examination of the shoulder at that time was negative, and a diagnosis of subacromial bursitis was made. After 3 roentgen treatments, complete relief of pain was experienced. The patient had no further trouble with the shoulder until November 1954. At that time, while wrestling with another man, he injured his shoulder. The pain then returned in the region of the shoulder and gradually increased in severity. In the two months before examination at this clinic, the pain was so severe that he was unable to work.

Examination revealed no limitation of motion of the right shoulder. Grade I pain was experienced with extreme dorsi-extension of the arm at the shoulder with the humerus abducted 90 degrees. Grade I tenderness was present over the posterolateral aspect of the shoulder at the level of the neck of the humerus.

X-ray examination revealed an area of decreased density in the upper third of the shaft of the humerus on its anteromedial aspect. Surrounding the central lesion was an area of bony sclerosis.

The patient was operated upon August 9, 1955, and the central nidus and surrounding area of bony sclerosis were excised (figure 5). Wound healing was uneventful. There was some pain postoperatively in the right shoulder but different in character from that experienced preoperatively.

When seen on October 24, 1955, the patient complained that pain in the right shoulder was still severe enough to prevent him from working. His operative wound was well healed. Motion was normal in the shoulder and not painful. Grade I tenderness was present over the anterior aspect of the shoulder joint but no tenderness over the posterolateral joint as noted preoperatively. X-ray examination of the shoulder revealed a surgical defect in the region of the former osteoid osteoma. A diagnosis of periarthrititis of the shoulder was made and 3 roentgen treatments were given.

On November 12, 1955, the patient shot a deer. While attempting to cut its throat, he experienced pain in the upper right arm. He was seen in the office two days later wearing a sling, and examination revealed tenderness and some induration over the upper third of the right humerus. A roentgenogram of the shoulder and humerus revealed a linear fracture without displacement which involved the upper third of the shaft immediately adjacent to the surgical defect in the bone. A shoulder spica cast was applied and worn for a period of eight weeks. The cast was removed January 20, 1956, and a roentgenogram revealed that the fracture had healed. The pain of which the patient had complained postop-



Fig. 3. Specimen of thickened cortical bone with pin in central nidus removed from case 2.

eratively had disappeared, and he was advised to resume gradual use of his arm.

Case 4. K. J., a 27-year-old man, was first seen in the orthopedic section of the Northwest Clinie on February 22, 1950. His complaint at that time was of weakness in the left leg of several years' duration. At the age of 12 he had been kicked in the left shin by another boy. After this injury his leg was sore for several days. Two or three months later, he again injured his left leg while driving a hayrack, and after this accident soreness persisted for several months. He was seen at that time by his family physician who x-rayed his leg and told him that a small bone abseess was present in the tibia. Soreness and slight swelling persisted in the left leg for two years. At no time was drainage noted. During the fifteen years prior to examination at this clinie, he had had no trouble with the leg but noticed some tenderness whenever it was accidentally bumped.

Examination revealed moderate thickening over the mid-third of the left tibia on the anteromedial surface. The involved area was slightly tender on pressure. No increased heat or redness was noted. Measurements from the anterior superior iliae spine to the medial malleolus were 35 in. on the right and 35¼ in. on the left.



Fig. 5. Bone specimen removed from case 3 after section. Tissue from nidus has been removed and lies between two large fragments.



Fig. 4. Roentgenogram of bone specimen from case 2 showing radiolucent nidus in center.

The circumference of the legs at the area of greatest thickening was 25 in. on the right and 26 in. on the left.

Roentgen examination of the left tibia revealed thickening of the medial cortex in the mid-third of the bone with several small areas of decreased density (figure 6). A speculative diagnosis of healed osteoid osteoma was made.

Case 5. J. S., a 16-year-old girl, was first seen in the orthopedic section of the Northwest Clinie on Septem-



Fig. 6. Roentgenogram of left tibia of case 4 fifteen years after onset of symptoms suggestive of osteoid osteoma.

ber 3, 1946, with the complaint of pain and swelling of the upper left leg of ten months' duration. A painless swelling over the upper tibia just below the knee was first noted in November 1945. In February 1946, the lesion was occasionally painful and ached at night. However, the pain was not sufficient to prevent or interfere with sleep. Examination revealed a slight tender enlargement 2 by 3 by 0.5 in. in size over the upper left tibia just distal and medial to the tibial tubercle. Roentgen examination revealed a dense area of bone in the proximal end of the shaft of the tibia which contained a small radiolucent area in the cortex in the center of the region of sclerosis. A diagnosis of osteoid osteoma was made, and the tumor was excised September 7, 1946. The sclerotic bone was removed with an osteotome and was noted to be very dense, making chiseling difficult. Pathologic examination of the excised lesion revealed a central nidus containing osteoid tissue with a fibrous stroma and numerous giant cells typical of osteoid osteoma. The postoperative course was uneventful except for a small stitch abscess which healed after a silk suture was removed from the wound. Pain was relieved postoperatively.

SUMMARY

The literature of osteoid osteoma has been reviewed and 4 case reports presented of patients operated upon who had typical lesions. Also, 1 case report has been presented of a patient whose history and clinical and x-ray findings suggested osteoid osteoma but in whom healing occurred after several years without surgery.

Typical osteoid osteoma is a painful, benign bone lesion containing a central nidus surrounded by an area of dense sclerosis and occurring most frequently in adolescents and young adults. The lesion is probably neoplastic in origin. When the central nidus is adequately excised, the tumor does not tend to recur.

Pathologically, dense cortical thickening is present in the region of the lesion, and in the center of the sclerotic bone lies a nidus con-

taining vascular, brownish-red, somewhat gritty tissue. Microscopically, a connective tissue stroma is seen which contains abundant osteoid tissue with many osteoblastic cells and irregularly calcified trabeculae. Occasional plasma cells and osteoclasts are present. When the lesion is adjacent to a joint, nonspecific changes may occur in the joint consisting of villous proliferation of the synovial membrane and occasional marginal osteophyte formation. The diaphysis of long bones is usually involved, but short or flat cancellous bones are sometimes the site of this tumor. In the latter case, the central nidus is often larger and more opaque, and the surrounding sclerosis may be absent.

Although the size of the nidus is usually small, a new form of osteoid osteoma entitled "giant osteoid osteoma," in which the nidus varies from 2.5 to more than 5 cm. in diameter, has been described by Dahlin and Johnson.

Although osteoid osteoma is a benign tumor and tends to heal after a period of years, surgical excision is indicated for relief of severe pain. The nidus should be completely removed with some of the surrounding sclerotic bone. Caution should be employed, however, in removing excessive amounts of bone, since a pathologic fracture may result.

CONCLUSIONS

Osteoid osteoma is a benign, neoplastic lesion of bone. It tends to heal spontaneously over a number of years, but surgical excision is indicated for relief of pain. The nidus should be completely excised with a surrounding margin of sclerotic bone, but excessive bone excision predisposes to pathologic fracture.

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Idiopathic Pulmonary Hemosiderosis

Essential Brown Induration of the Lung

Report of a Case and Review of Literature

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IDIOPATHIC pulmonary hemosiderosis is a rare and often fatal disease of children involving interstitial pulmonary infiltration and hemosiderosis localized to lung tissue. Recurrent acute attacks of dyspnea, cyanosis, tachycardia, and pallor may be alarming, and frequently suggest the clinical picture of congestive heart failure. A severe anemia develops and the roentgen examination of the lungs reveals mottled shadows with diffuse speckling distributed throughout both lung fields.

Until Waldenström¹ described the first case of primary pulmonary hemosiderosis diagnosed during life, the condition was regarded as a pathologic-anatomic curiosity. Today there is an increasing awareness of pulmonary hemosiderin deposits occurring in patients with unexplained recurrent hemorrhage.

Hemosiderin may be deposited in the lungs in any disorder causing pulmonary hemorrhage, but as far as is known hemosiderin is detected by roentgen examination in only 2 conditions. Most reported cases of pulmonary hemosiderosis follow pulmonary hemorrhage secondary to mitral stenosis. In this group of cases, the precipitating, if not the true etiologic factor, is known. This disorder occurs in young adults, chiefly males, with mitral stenosis. It is interesting to note that 4 out of 5 cases are in males in contradistinction to the predominance of mitral stenosis in females. Conditions as yet unrecognized must be favorable for the occurrence of the deposition of this pigment in the lungs of certain patients, for it is reported in but a few of the many cases of mitral stenosis.

In a review of 40¹⁻³² cases of primary pulmonary hemosiderosis found in medical literature, only 4 were from the United States. The onset occurred under 16 years of age in all but 1 patient¹¹ who was 38 years old. In the 40 cases plus our own case, there were 7 under the age of 2 years, 24 from age 2 to 10, and 4 from 11 to 16. The remaining 5 were children, but no age was stated. Of the 41 patients, 23 were female, 15 were male, and sex was not reported in 3. Of the 41 patients, 2 were Negro children.^{23,31,32} There appears to be no familial incidence.

NATURAL HISTORY OF THE DISEASE

The patient, most often a child, experiences rapid onset of fatigue, cyanosis, and tachycardia followed within a few hours by pallor, dyspnea, cough, and hemoptysis. The patient is restless, apprehensive, and obviously acutely ill. The clinical picture resembles congestive heart failure and oxygen therapy may be needed to relieve the respiratory distress. Because of the associated pallor and pronounced anemia, a mistaken diagnosis of hemolytic crisis is often made.

The cardiologist, the hematologist, and the radiologist are consulted early. There may be transient enlargement of the liver and spleen, and abdominal colic is often reported. Slight jaundice may develop. Ordinarily the attacks last only a few days. If the patient survives, recurrent episodes can be expected. Fever is frequently present. Other than occasional moderate right heart enlargement, there are no abnormal cardiac findings. Physical examination of the lungs ordinarily reveals little more than a few moist rales. The true nature of the condition may not be recognized unless roentgen studies of the lung are made. Most reports describe the pronounced disparity between the few clinical signs of pulmonary disease and the extensive and characteristic roentgenologic abnormalities. There is a diffuse mottling of the lung fields and an increase in hilar markings. The roentgen changes are less pronounced between episodes, but a general progression occurs until the disease terminates fatally.

Examination of the blood ordinarily reveals a pronounced anemia. The fall in hemoglobin, the reticulocytosis, and the presence of circulating normoblasts, together with the moderate normoblastic hyperplasia of the marrow represents an increased regeneration and liberation of erythrocytes, probably in response to blood loss. There is no evidence of familial hemolytic anemia and little to support the impression that the entire picture is based on generalized hemolysis.

Read at the Pediatric Grand Reunion honoring Dr. Irvine McQuarrie on his 25th year of service to the University of Minnesota.

Characteristically, occult blood is present in the stool which most authorities believe is derived from blood swallowed during hemoptysis. The serum bilirubin and urine urobilinogen may increase during the attacks.

If there is hemoptysis, examination of the sputum reveals macrophages with hemosiderin.^{18, 20, 23, 29, 30} Gastric washings reveal hemosiderin.^{22, 31} Lung aspiration biopsy has been attempted in 4 cases,^{17, 20, 22, 31} and revealed the presence in the pulmonary parenchyma of macrophages laden with hemosiderin.

The significant autopsy findings are limited to the lungs and are characteristic. In the gross, the lungs are firm and show the dark red-brown color of essential brown induration of the lungs. The right heart may be enlarged. Microscopically the alveoli are crowded with macrophages containing hemosiderin and fresh blood. The alveolar walls and interlobular and peribronchial tissue are thickened and contain hemosiderin. Fragmentation of the elastic fibers of alveolar walls and vessels has been a frequent finding. Garsche³³ found 11.51 gm. of iron per 100 gm. of ash in the lung tissue of a case of pulmonary hemosiderosis and 0.0061 gm. in a patient with no lung disorder.

If the individual survives the acute crisis, recovery may take place in a few days. During remission the patients usually are weak, underweight, and have poor exercise tolerance. Anemia may develop prior to or after the attacks. Physical signs of pulmonary disease are frequently insignificant between attacks. Eventually a chronic pulmonary insufficiency with cyanosis and dyspnea may develop. The severity of the clinical picture increases. The lung changes visible on roentgen ray become accentuated during exacerbations.

The confusion with hemolytic anemias and with cardiac decompensation is soon eliminated when little evidence can be found to support either of these diagnoses. Normal fragility tests and absence of spheroidocytes rule out familial hemolytic anemia. The negative Coombs' test rules out a secondary acquired hemolytic anemia. The increase in reticulocytes reflects the increase in red cell destruction and regeneration which is apparently due to a local hemolysis of the blood in the lung alveoli in patients with this disease.

Physical examination, chest roentgenogram, and electrocardiogram reveal little evidence of primary cardiac pathology. Tachycardia and possibly right heart enlargement are present which may be considered secondary to the increased pulmonary pressure. The real problem

in differential diagnosis has been to differentiate the diagnostic possibilities to be considered by roentgen findings. Waldenström^{7, 34} suggests that conditions to be considered include silicosis, miliary tuberculosis, lymphogranuloma benignum, intoxication by nitrous oxides, tumor metastases, miliary actinomycosis, and miliary blastomycosis. Elgenmark and Kjellberg¹⁹ state,

"The roentgen appearance of the lungs is so characteristic that pulmonary hemosiderosis can be diagnosed solely on the grounds of these findings in practically every case (for) no other disease produces at this age a roentgen picture showing diffuse shadows of increased density, scattered more or less all over both pulmonary fields and absolutely independent of the borders of the lobes — this cloudiness, however, often alternates with mottling of a mossy appearance. In the early stages of the disease as well as in remissions, the mottling is the dominant feature."

SUMMARY OF PREVIOUSLY REPORTED CASES

1. In 1930, Wits² published a report of cases of male chlorosis which included a description of a case which fits the syndrome of pulmonary hemosiderosis. Roentgen plates had been destroyed.

2. The first report of autopsy findings of pulmonary hemosiderosis was made by Ceelen³ in 1931. His first case was a 5-year-old boy who had had cough, hemoptysis, and severe anemia since he was 1 year of age. The lungs showed pronounced diffuse interstitial fibrosis with excessive masses of heart-failure cells containing iron pigment. The hemosiderosis was limited to the lungs and regional lymph nodes.

3. His second case, a 10-year-old girl, had a sudden onset of fever, pallor, dyspnea, cyanosis, abdominal pain, vomiting, and anemia. A clinical diagnosis of adhesive pericarditis had been made. The lungs showed extensive hemorrhagic induration, enormous deposits of hemosiderin in the thickened alveolar walls and in the spaces. The elastic fibers of the alveolar walls showed thickening, splitting, and fragmentation. Additional findings of interest were coarse hepatic cirrhosis and hemorrhagic pachymeningitis. The bone marrow had little fat and was hyperplastic.

4. Filo,⁴ in 1933 reported a case of relapsing hypochromic anemia beginning at puberty in a boy with hypogenitalism. Dyspnea, cough, hemoptysis, and pallor were noted. He had a good response to iron therapy, lasting about a year and a half. Roentgen studies of the chest were reported to be normal on two occasions.

5. Montaldo,⁵ in 1938 published a case of a 2-year-old girl and gave a very complete anatomic report. He compares this condition of hemolysis in the lungs with the Marchiafava-Micheli syndrome in which hemolysis is localized to the kidneys.

6. In 1940, Waldenström⁷ described a case diagnosed at autopsy in a 14-year-old boy. He had had several exacerbations of a hypochromic anemia. He showed very slight changes in the roentgen studies of the lung when he was first admitted in a state of severe anemia. Later, with laboratory evidence that the anemia was less severe, he showed roentgen evidence of pulmonary involvement and expired with symptoms of suffocation. Gellerstedt⁶ in 1939 had reported the autopsy findings of this case. He considered the local pulmonary capillary weakness to be the primary cause.

7. The first case to be diagnosed clinically was that first reported by Waldenström in 1938 at the Swedish

Society for Internal Medicine and 1940 Nordisk Medicine.^{1,7} A 16-year-old girl showed clinical and laboratory evidence of both an iron-deficiency and a hemolytic anemia. Because of a low grade fever and cough, roentgen studies of the lung were taken and a diagnosis of pulmonary hemosiderosis was made. The patient expired with signs of suffocation at the age of 18 during an exacerbation. Belfrage,⁸ in 1943, reported the autopsy findings which confirmed the clinical diagnosis.

8. Anspaeh,⁹ in 1939 described the condition as important in a differential diagnosis of the roentgen picture of the lungs. He reported a case with autopsy findings in a 7-year-old girl who also had celiac disease. He describes a necrotizing arteritis in addition to the widespread hemorrhage, hemosiderin, and fibrosis of the lungs.

9. Glanzmann and Walthard,¹⁰ in 1941 reported a case of idiopathic progressive brown lung induration in an 11-year-old girl who experienced frequent attacks of fatigue, dyspnea, pallor, hemoptysis, abdominal colic, and tachycardia. She had severe anemia, leukopenia, and was the first case noted to have a slight eosinophilia. Roentgen and autopsy findings were typical. The authors spoke of an "interalveolar cirrhosis" and defective formation of elastic fibers of the alveolar walls, capillaries, and interlobar septae.

10, 11, 12. Boros-Nachtnebel,¹¹ in 1942 reported 3 cases. A man aged 38 is the only patient encountered who was over 16 years of age. The other cases were in a girl aged 2½ and a boy aged 4 years. The author attributed the pathogenesis to a defect in pulmonary tissue.

13, 14. Nitschke,¹² in 1944 reported 2 cases in children who had recurrent anemia which responded to iron therapy and transfusions. Hemoptysis and dyspnea together with characteristic roentgen findings of the lungs were noted, and autopsy showed hemosiderosis confined to the lungs and regional nodes.

15. Pilcher and Eitzen,¹³ in 1944 diagnosed a case of pulmonary hemosiderosis in a 5-year-old white boy. The diagnosis was entertained clinically, but absence of such clinical findings as hemoptysis prevented complete acceptance of this diagnosis. Anemia, progressive evidence of cor pulmonale, and roentgenographic evidence of a diffuse fibrosis of the lungs were the chief antemortem findings. A complete autopsy report is given which disclosed extensive fibrosis of the lungs, with a pronounced deposition of hemosiderin and siderotic nodules and right ventricular hypertrophy.

16. Selander,¹⁴ in 1944, reported a case in a girl with a long history of respiratory distress and anemia who died at the age of 8. There were typical roentgen studies and autopsy findings.

17. Reye,¹⁵ in 1945 reported a case in a girl aged 2 years and 9 months who presented with a severe anemia of fairly rapid onset and progressed to pulmonary embarrassment and death in a fourteen-month period. Diagnosis of pulmonary hemosiderosis was made at autopsy. A complete and careful report of gross and histologic findings is included. Erythrocytes and cells with hemosiderin packed the alveoli; the interstitial tissue was thickened and there was an increase of elastic tissue. Capillaries and larger vessels were said to be normal.

18. Scheidegger and Dreyfus,¹⁶ in 1945 reported a case in a female infant in which death occurred at the age of 1 year. Symptoms dated to the fourth month. Both heart and lungs were normal on numerous x-ray and physical examinations. There was pronounced ane-

mia. Pulmonary hemosiderosis was noted at autopsy. Alveoli were packed with hemosiderin-laden epithelial cells. Similar deposits were found in the bronchial epithelium and vascular endothelium. The vessel walls showed fine fatty changes, but unlike many other reports there were no alterations in elastic tissue found.

19. Barlow,¹⁷ in 1946 described a typical clinical picture in a 6-year-old girl and supported the diagnosis by aspiration lung biopsy demonstrating macrophages filled with hemosiderin. Because of the poor prognosis, the spleen was removed, but no improvement was noted at the time the case was reported. Barlow was the first to use lung biopsy in this condition and also the first to use splenectomy.

20. Hanssen,¹⁸ in 1947 described a case of a girl, aged 6½ years, who had repeated hemoptyses associated with hypochromic anemia over a four-year period. He sectioned the sputum and demonstrated macrophages with hemosiderin. There was no anemia during the last few months, but dyspnea and cyanosis increased. No autopsy was performed.

21. In 1948, Elgenmark and Kjellberg¹⁹ presented a case in a 6-year-old girl diagnosed on the basis of the clinical picture and the x-ray findings. Onset began in infancy and although there had been several exacerbations, there was some regression of the clinical findings, such as clubbing of the fingers. She was alive and well at the age of 6.

Wyllie and associates,²⁰ in 1948, reported 7 cases in children under 13 years of age. All had anemia and characteristic chest roentgenograms. All but 1 had hemoptysis. They found hemosiderin in the vomitus and urine of their third case and in aspiration lung puncture of the fourth case.

22. Recurrent attacks of dyspnea and pallor in a 13-year-old girl since she was 2 years old. They lasted about one week and tended to become more frequent.

23. A boy, 4½ years of age, experienced several episodes of cyanosis, dyspnea, hematemesis, pneumonia, and anemia. Histologic studies of autopsy material showed thickened pleura with frank hemorrhage into the pleura over the right middle lobe, alveoli stuffed with erythrocytes and hemosiderin-laden macrophages, hypoplasia of elastic tissue, and fibrous thickening of the peribular septa are described.

24. A girl, aged 10, had experienced attacks of cough, dyspnea, fever, and pallor every three or four weeks since age 7 years. These attacks lasted one to five days and she became severely prostrated. Hemosiderin was found in vomitus and in a twenty-four-hour specimen of urine. At autopsy, carmine in gelatin was injected into the pulmonary circulation in an attempt to demonstrate vascular abnormalities, but none were found. Liver, spleen, kidney, and urine gave a positive Prussian blue reaction. Interlobular septae were thickened and elastic fibers were degenerated or absent, and there was massive infiltration of air sacs with free hemosiderin pigment and macrophages.

25. Attacks began at 18 months of age and recurred every few weeks. Cough, dyspnea, and anemia were pronounced. Aspiration lung biopsy was done to exclude tuberculosis, and pigment-filled macrophages were found. Splenectomy was done at the age of 8 and the anemia and attacks became less severe during the post-operative period of the six months she was observed.

26. This girl had attacks of fever, cough, dyspnea, and hemoptysis since the age of 3½ years. Anemia was not pronounced. X-ray studies of the lungs showed the characteristic mottling.

27. A 5½-year-old girl had recurrent attacks of cyanosis, fatigue, tachycardia, and pallor since infancy. Some improvement followed iron therapy.

28. A 3½-year-old boy had been admitted to the hospital for anemia at the age of 10 months. Chest roentgenogram showed generalized patchy consolidation. He was given transfusions and for most of the following eighteen months he was in oxygen for cough, fever, cyanosis, dyspnea, and tachypnea. He had not had any attacks twelve months prior to the report of the case.

29. de Castro Freire and Cordeiro,²¹ in 1948 described a case in a 6-year-old boy with characteristic clinical findings including recurrent hemoptysis and a severe anemia. He had purpura and a reduced platelet count. Splenectomy was done for fear brown induration of the lungs would develop and response was good. There has been no anemia, no thrombocytopenia, and no hemoptysis. Lung roentgenograms are described as showing a gradual but complete regression following splenectomy. This is the first report of an associated thrombocytopenic purpura and the first case reported "healed" with splenectomy.

30. King,²² in 1949 presented a typical case in a 2-year-old girl. Stomach washings and lung biopsy showed hemosiderin-laden phagocytes.

31. Luther,²³ in 1949 reported a case in a colored boy aged 3½ years who had a sudden onset of symptoms characteristic of this condition. An initial observer reported the sickling phenomenon of the erythrocytes, but this could never be confirmed on repeated testing. He has experienced several episodes with persistent roentgen findings. Bronchial washings showed macrophages filled with hemosiderin.

32. McLetchie and Colpitts²⁴ in 1949 presented a classical case complete with autopsy report in a 4½-year-old boy who had had onset of symptoms at the age of 1 year. They consider that most of the morbid pulmonary findings can be considered as changes secondary to anoxemia due to an unknown primary lung condition.

33. Nancekivill,²⁵ in 1949 reported a rapidly progressive case in a previously healthy 2½-year-old girl. Death followed five weeks after the onset. This author, like many others, commented on the radiologic changes in the lung field and the minimum clinical signs in the chest. Autopsy findings confirmed the diagnosis. He compared both the dry weight and the iron content of the patient's lung with that in 2 cases of normal adult lungs (table 1).

TABLE 1

	Dry weight as a % of wet weight	Iron content of 100 gm. wet weight	Iron content of 100 gm. dry weight
Patient	43.2%	230 mg. %	542 mg. %
Control	18%	63 mg. %	320 mg. %

34. Scott, Park and Lendrum,²⁶ in 1947 refer briefly to 2 cases in children. One child had hemolytic anemia, and at autopsy pulmonary hemosiderosis was confirmed and, also, the proximal end of the aorta was constricted.

35. Their second case was in a child aged 11 who had had anemia from the age of 1 year and 10 months. Because of x-ray studies of the lungs, she had originally been diagnosed as a case of miliary tuberculosis.

36. Jonsson and associates,²⁷ in 1951 followed a typical case with fatal termination in a 5-year-old boy. Chemical analysis of the lungs of the patient showed huge amounts of hydrolyzable iron. Their patient had 1.97 mg. per gram of lung tissue. Lung tissue from 5

normal patients who died as a result of accidents contained 0.03 mg. iron per gram of tissue.

37. Walton and Williams,²⁸ in 1951 described a 16-year-old boy initially diagnosed as a case of a bronchopneumonic spread of tuberculosis, but later the possibility of idiopathic pulmonary hemosiderosis was considered. He had had a history of dyspnea with exercise and then experienced a sudden onset of weakness, fever, hemoptysis, and anemia. After several episodes, he died at age 19 and autopsy confirmed the diagnosis.

38. Corridan and associates,²⁹ in 1952 commented on the infrequency of diagnosis of this condition antemortem and reported a case in a girl who had onset of symptoms at 5 years of age and was seen by them at the age of 14 when roentgen studies demonstrated countless minute opacities giving a pumice-stone appearance.

39. Cordeiro,³⁰ in 1952 described a typical case in a 4-year-old girl who is reported to be "healed" following splenectomy. She had had a sudden onset of frequent episodes with typical x-ray findings. Section of hemoptysis material revealed hemosiderin and hemosiderophages. The patient showed some ecchymoses and a positive Rumpel-Leed test. Because of the association of increased vascular fragility with pulmonary hemosiderosis, splenectomy was tried and was apparently successful, for she is reported to be "cured." The pathologists reported the spleen showed a remarkable increase in plasma cells.

40. Gellis and associates,³¹ in 1953, and Fleischer and Berenberg³² reported a case in a 2½-year-old Negro boy with anemia. Because sputum could not be obtained and gastric washings were equivocal for hemosiderin, aspiration lung puncture was done which yielded macrophages with hemosiderin. These are well shown in a color plate. Numerous laboratory studies included negative Coombs', sickling, liver function, blood culture, serology, and tuberculin tests.

CASE REPORT

February 26, 1951, M.M.A., a 7-year-old white girl, born August 28, 1943, was first seen in the pediatric outpatient department of the University of Minnesota Hospitals for evaluation of an anemia.

Her parents stated that she tired easily, tended to be underweight, and had been anemic since infancy. Her birth weight was 5 lb. and she was reported to be deeply cyanotic at birth. An incubator was necessary for the first week of life. Other than easy fatigability, her mother feels that she developed normally. June 1950, fatigue increased and urinary frequency developed. The physician consulted at this time noted the presence of severe anemia with a hemoglobin of 25 per cent. He treated the urinary infection with an antibiotic and gave 2 blood transfusions. A roentgenogram of the lungs was reported to resemble miliary tuberculosis, but no additional evidence supported this diagnosis. She responded to the blood transfusion and was well until December 1950 when she had 4 episodes of hemoptysis. At this time chest roentgenograms were sent to one of us (L.G.R.), who made the diagnosis of pulmonary hemosiderosis. She was then referred to this hospital for more complete evaluation and was meanwhile given oral iron therapy which was continued up to February 26, 1951, her first visit to our clinic.

There appears to be little of additional significance in the patient's history. Chicken pox at age 6, measles at age 5, and pertussis at age 2 had been mild and without complications. There had been no surgery and no other hospitalization. She had never had jaundice nor

abnormally colored urine or stools. The family history contributed nothing of significance, with no history of anemia or other blood dyscrasia and no history of relatives with Mediterranean or Negro extraction.

Significant physical findings at the first clinic visit were few. The liver edge was palpable, firm and nontender. Blood pressure was 112/82 mm. of Hg, pulse rate 108 per minute, respiratory rate 20 per minute, weight 46 lb., and height 47½ inches. Plotting her weight and height on the Wetzel³⁵ grid showed her to be on the borderline between physique channels B₁ and B₂ and the seventy-fifth percentile on the age schedule of development (auxodrome). Examination revealed normal skin, lungs, and heart.

Laboratory examination on February 26 showed a slightly elevated reticulocyte count, 3.5 per cent. Other findings were within normal limits: hemoglobin 14.2 gm., erythrocytes 3.84 million per cubic millimeter, leukocytes 8.9 thousand per cubic millimeter, with a normal differential count, platelets 284 thousand, hematocrit 39 per cent. She had an erythrocyte sedimentation rate of 19 mm. in 60 minutes. Urinalysis showed no significant abnormalities. Serum bilirubin for one minute was 0.2 and 1.0 total. A roentgenogram of her chest was reported to show findings compatible with the diagnosis of hemosiderosis. Mantoux and a histoplasmin skin tests were negative.

Iron therapy which had been instituted by her local physician was discontinued on February 26, 1951 to prepare for serum iron studies done March 6, 1951. Serum iron was low, 22 gamma per cent and she showed a normal serum iron binding capacity.

March 15, 1951 she was again seen in the clinic and increased fatigue and weakness were noted, and at this time the edge of the spleen was palpable. Her appetite was poor. She had had no hemoptysis since oral iron had been discontinued.

March 25, 1951 she became acutely ill and was hospitalized here. Listlessness had been marked the day before and some cyanosis and dyspnea noted. She spit up some bright red blood on 2 occasions. Her physician gave 1 penicillin injection and referred her here.

Physical examination revealed the following of significance. T. 103.2° F., PR 160, RR 84, BP 98/60, cyanosis, dyspnea and pronounced lassitude. A few fine, scattered rales were the only pulmonary physical findings. No cardiac abnormalities other than the tachycardia were noted. Abdomen and skin and neurologic findings were normal. The cuff test was negative.

Laboratory studies showed a hemoglobin of 6.8 gm., erythrocyte count of 3.1 million per cubic millimeter, hematocrit 25.5 per cent, leukocyte count 35,350 with some circulating normoblasts and an increase in neutrophils. The stool specimen showed a 4 plus guaiac for occult blood, and the feces urobilinogen was slightly elevated, being 408 Ehrlich units per 100 gm. of feces. The following were normal: electrocardiogram, erythrocyte fragility, erythrocyte sickling test, direct and indirect Coombs' test, macroscopic agglutinations for *Eberthella typhosa*, salmonella A and B, Brucella, serology, blood culture, blood urea nitrogen, carbon dioxide combining power, chlorides, sodium, and bilirubin. A chest roentgenogram at this time was technically unsatisfactory.

She was placed in an oxygen tent and given intravenous Aureomycin, and intravenous electrolyte solutions. She received 200 cc. of blood on March 27, 1951, and improved and was out of oxygen on March 28, 1951.

On March 26, 1951, a sternal marrow aspiration showed a normoblastic hyperplasia, some evidence of

increased erythrocyte regeneration, slight hypochromic anemia and a toxic neutrophil leukocytosis. All of these findings were attributed to acute blood loss.

Roentgenograms on March 27, 1951 showed some clearing of the diffuse infiltrative process throughout both lungs with some clearing of an acute edema. The picture was thought to be consistent with hemosiderosis. Skull and wrist and hand roentgenograms were normal. Roentgenogram on April 6 showed the diffuse infiltrative process with some resolution at the periphery of the right side. Both root shadows were prominent and there was some suggestion of a right heart enlargement.

The reticulocyte count increased to 11.3 per cent on March 30 and some urobilin was noted on March 27. The hemoglobin rose to 8.4 gm. and the leukocyte count approached normal on April 4. She made a rather rapid clinical recovery and was discharged to the care of her physician April 6, 1951.

Three weeks after discharge she had another exacerbation of her symptoms and was hospitalized for five days at another hospital. She has been followed by her local physician and has been given liver, iron, and vitamin B complex. There has been no attack since May 1951. Her mother describes her as very active, thin, and subject to upper respiratory infections which "take her down." She has had no iron for several months.

In September 1953, her height and weight plotted on the Wetzel grid³⁵ showed her to be in channel B₁, and the seventy-fifth percentile of development schedule. At the present time, September 1954, she has dropped to channel B₂ and the eighty-seventh percentile. Table 2 is a tabulation of pertinent data for all cases.

HISTORY AND PATHOGENESIS

The etiology of primary pulmonary hemosiderosis is unknown and the term idiopathic must be retained. Various hypotheses have been represented to explain this clinical and pathologic entity. In 1931, Ceelen³ described the anatomic lesions in 2 cases showing extensive hemosiderosis confined to the lungs. He quotes Virchow as the first and only author who had described similar autopsy findings. A translation follows.³⁶

"... another rare condition that I have been able to observe, sometimes in adults, often in young girls. It certainly belongs to the so-called brown induration that was described by me. There is found no heart disease, however, and there are no signs of any deranged circulation. In spite of this, there is a great accumulation of brownish pigment in the lungs, and this is chiefly located in the cellular elements of the alveoli. These latter are closely filled with inflammatory round cells and the tissue consequently feels infiltrated. The entrance of air into the alveoli is hindered..."

Ceelen did not believe the condition to be due to a blood disorder, but thought it to be a primary fault of the lungs. He described changes in the elastic tissue of the lungs with hypertrophy of the interalveolar tissue.

Waldenström^{1,7,34} considers that there is a primary pulmonary disturbance which allows extravasation of blood into the alveoli by diapedesis. He does not believe the anemia in these cases need result from the pulmonary hemorrhage, for in 1 of his cases when the patient

TABLE 2
SIGNIFICANT FINDINGS IN 41 CASES OF
IDIOPATHIC PULMONARY HEMOSIDEROSIS

	Plus	Minus	Not reported
Sudden onset	18	2	21
Family history	2	16	23
Relapses	26	0	15
Diagnostic chest roentgenogram	36	1	1
Autopsy	21	1	19
Cough	20	2	19
Dyspnea	24	1	16
Hemoptysis	26	5	10
Pallor	22	0	19
Cyanosis	11	2	28
Tachypnea	10	—	31
Tachycardia	15	—	26
Hepatomegaly	7	20	14
Splenomegaly	10	19	12
Cardiomegaly	13	17	11
Abnormal pulmonary physical findings	13	4	24
Fever	26	2	13
Jaundice (slight)	5	1	35
Abdominal colic	15	3	23
Weakness	17	0	24
Anemia	37	1	3
Reticulocytosis before therapy	13	—	28
Leukocytosis	12	15	14
Eosinophilia	10	14	17
Fragility increased	0	18	23
Coombs	3	3	35
Serum bilirubin	8	1 (normal)	32
Serum iron	2 (increased as in hypochromic anemia)	1 (normal)	38
Urine urobilin and urobilinogen	14	4	23
Marrow		11 (normal or normoblastic hyperplasia and 1 with leukocytic hyperplasia)	30
Sputum hemosiderin	7	1	33
Lung biopsy	4		37
Node biopsy	1		40
Splenectomy	4		37

was first admitted for study of anemia, the lung picture was then normal. When the boy suddenly expired from apparent suffocation, his anemia was considered to have become no worse. He believes that the sign of increased red cell destruction and regeneration — bilirubinemia, reticulocytosis and urobilinuria—with hypochromic anemia are best explained by the hemolysis of blood in the lungs after intrapulmonary bleeding. Others^{9-11, 13, 15, 20} favor the theory that a specific pulmonary structural defect provides the basis for the condition. Of this group, many believe the defect reflects a capillary defect.^{6, 9} Still others consider the vessel disorder to be secondary to defective interstitial tissue.^{10, 20, 29}

Glanzmann and Walther¹⁰ postulate a disorder of pulmonary circulation secondary to interalveolar cirrhosis and defective formation of elastic fibers in the alveolar walls, interlobular septae, and capillaries.

Wyllie and associates²⁰ suggest that the primary defect may be the increased fibrous tissue and decrease in elastic fibers of the interstitial tissue leading to lack of distensibility of the

lungs with consequent peripheral stasis in the capillary bed. This, they postulate, is followed by hemorrhage, by diapedesis, and deposition of hemosiderin. They consider the hemosiderin deposits, fibrosis, and areas of collapse to be the pathologic basis of the characteristic radiologic appearance. They found no evidence in their 7 cases of myocardial damage to account for the pulmonary lesion.

McLetchie and Colpitts²⁴ believe that a permanent structural alveolar defect hardly explains the periodicity of the attacks. They postulate that the primary abnormality is one of defective vasomotor control of capillary tone, and feel it explains the periodicity and degree of lung changes and the sudden onset.

Pilcher and Eitzen¹³ consider several of the possibilities which could be the primary lesion and attempt to correlate each with the findings in their case. They do not consider pigmentation need be the primary cause, because, quoting Sheldon,³⁷ they state hemosiderin may be deposited in the lungs without fibrosis.

Reye¹⁵ concludes that repeated intrapulmonary hemorrhage by slow oozing from a postulated congenital or acquired weakness of the capillary bed could explain the clinical and pathologic picture. Because all the iron is not free for reutilization, there is a low color index. Since hemosiderin is found in the regional nodes, Reye¹⁵ thinks that some breakdown of hemoglobin has occurred and that this may account for the increase in circulating bilirubin. However, he points out that the primary condition cannot be hemolytic disease, since the hemosiderin deposition is not found throughout the reticuloendothelial system. He adds that the hypochromic anemia indicates that iron is not freely available as would be expected in a hemolytic process.

Scheidegger and Dreyfus¹⁶ believe that an inflammatory process must be considered a source of the pulmonary bleeding and that a congenital predisposition to weakness remained unproved.

Ferguson and associates³⁸ and Lendrum²⁶ suggest bleeding may originate from small back-pressure varicosities of the anastomosis between bronchiolar branches of the bronchial vessels and pulmonary artery. On the grounds that the hemosiderin accumulations are in close anatomic relationship to the sites of these anastomoses, Lendrum³⁹ recalls that the varicosities may be as difficult to demonstrate as are esophageal varices.

Magarey⁴⁰ attempted to refute this hypothesis by experimentally producing hemosiderosis in rats by the introduction of endotracheal blood and demonstrated a similar distribution of he-

mosiderin. He believes these aggregations can accompany diffuse hemorrhage and are not necessarily the result of focal hemorrhages from dilated vascular anastomosis.

Several papers can be cited which demonstrate the existence of precapillary anastomosis between the pulmonary and bronchial vessels. Miller,⁴¹ in 1937, demonstrated the nature of the bronchopulmonary circulation and showed that it extended even to the pleura.

Liebow and associates,⁴²⁻⁴⁸ have demonstrated by vinylite corrosion casts the anastomoses between the vessels of the two circulations in normal and in diseased lungs. In one paper, they report the greatly enlarged bronchial arteries and excessive mediastinal collateral vessels in cases with congenital pulmonary stenosis. Their studies have shown that in chronic pulmonary disease and also in some forms of congenital heart disease, an extensive collateral circulation may develop with large anastomoses between the bronchial and the pulmonary arteries.

Verloop⁴⁹ demonstrated the increase in longitudinal muscle fibers in the intima of pulmonary arteries so that the lumen may be quite closed. He showed that in newborn infants the precapillary anastomoses between the 2 arterial systems is present but the thickening of the intima is lacking until it develops later in childhood. He feels that the muscular thickening has a great effect in reducing the difference in pressure between arteries which anastomose arterially and in regulating the supply of blood to the bronchial wall and visceral pleura.

Strassmann⁵⁰ reports the experimental induction of a form of pulmonary hemosiderosis. He injected blood into the trachea in rabbits and found that most or all of the erythrocytes disappeared during the first twenty-four hours, apparently by mobilization of the alveolar lining cells as phagocytes. No local deposition of hemosiderin occurred. However, when he produced a transitory pulmonary edema by combining blood with hypertonic dextrose solution, the disappearance of red cells was delayed for as long a period as a week, and hemosiderin appeared in the alveolar macrophages during the second day.

When a second introduction of blood and glucose solution was given seven to fourteen days after the first, the macrophages were reactivated and mobilized.

Gumpert⁵¹ suggested that edema and venous congestion may cause obstruction to normal lymphatic drainage of alveolar histiocytes responsible for removal of intra-alveolar red cells. Edema is not such a clear-cut picture in children and this mechanism referred to may be more

pertinent to the adult type which is associated with mitral stenosis.

Kerley⁵² contends that hemosiderin is deposited in the lungs because it is insoluble in the alkaline medium of the edematous lung. On the other hand, in some patients there is no x-ray nor clinical evidence of edema. Many cardiac cases have hemoptysis, but few have pulmonary hemosiderosis.

Wintrobe⁵³ describes the hypochromic anemia seen in dogs, swine, and some rats which develops on a diet lacking pyridoxine. The spleen, liver, marrow, and kidney have hemosiderin deposition, but no mention is made of pulmonary hemosiderosis. Pyridoxine deficiency induced in human beings produced no blood changes.

Béla Steiner⁵⁴ reported a case of pulmonary hemosiderosis in a 6-year-old boy diagnosed by thoracotomy. Only two exacerbations followed splenectomy and these occurred after respiratory infections. Steiner reviewed evidence favoring the immuno-allergic concept of pathogenesis with lungs as the shock organ. Capillary dilatation, consequent stasis, diapedesis, rhexis, destruction of damaged erythrocytes, and deposition of hemosiderin are described. Why the pathology remains localized to the lungs is still unanswered.

ROENTGEN DIAGNOSIS

Waldenström³⁴ bases the final diagnosis on the roentgen studies. The radiologic reports of the published cases uniformly describe a diffuse mottling with miliary opacities throughout both lungs together with enlargement of hilar shadows. The roentgenographic findings are more pronounced during an attack, but the pulmonary fibrosis is progressive and the pulmonary radiographic signs are almost always conspicuous. The differential diagnosis includes miliary tuberculosis, pneumoconiosis, mycotic infections, sarcoidosis, bronchiolitis, carcinomatous lymphangitis, and leukemic infiltration.

Elgenmark and Kjellberg¹⁹ believe that pulmonary hemosiderosis can be diagnosed solely on x-ray evidence in almost every case, for they state that no other disease occurring during childhood produces a roentgen picture of diffuse shadows throughout both lungs which is absolutely independent of the borders of the lobes.

Park²⁶ believes the shadows are due to iron pigments and that the size of the spots can be accounted for by the overlap of shadows of individual foci. He refers to the similar roentgen shadows seen in the experimental incorporation of fine iron filings in wax. However, doubtless some of the shadows are the result of fibrosis.

PATHOLOGY

Hemosiderin is considered to be an abnormal stage of iron deposition^{53,55} and is microscopically visible in contrast to ferritin, a normal stage in erythrocyte breakdown. Ferritin is diffusely distributed in cells and is not visible microscopically nor is it as readily detectable with Prussian blue which stains hemosiderin.

Autopsy results are available for 22 of the 23 cases dead at the time of reporting. Pathologic findings in this condition are strikingly uniform being limited primarily to the lungs. In the gross, the lungs are firm and show a diffuse red-brown induration. Consolidation is present throughout and they are firm, heavy, and rubbery. No signs of inflammation are present. The cut surface resembles liver and frequently shows a brown mottling. The brown spots give a strongly positive Prussian blue reaction.²⁶

Although pleural surfaces show no abnormality, subpleural hemorrhage may be present. The tracheobronchial glands are frequently enlarged and pigmented.

Histologically the alveoli contain many hemosiderin laden macrophages and fresh blood. Interstitial fibrosis, generalized interstitial edema, and fragmentation of the elastic fibers of alveolar walls and vessels are usually present.

Garsche³³ demonstrated the iron content of lung tissue in a case of hemosiderosis and found that there was 11.51 gm. of iron per 100 gm. of ash compared with 0.0061 gm. in a control case.

The heart may show slight to moderate dilatation and, or hypertrophy; but no myocardial or valvular abnormalities sufficient to account for the disease have been described. In a few instances, congestion has been present in the liver and spleen. Wyllie and associates²⁰ noted the pieces of liver, spleen, and kidney did give a Prussian blue reaction in 1 of their 2 autopsy reports.

THERAPY

In the face of the lack of knowledge concerning etiology and pathogenesis of this disease, therapy must be supportive. The administration of blood and oxygen have frequently been followed by dramatic relief of symptoms. Several have reported favorable results as long as oral iron is taken. A few have tried liver, folic acid, vitamins, antibiotics, and heliotherapy. Splenectomy was done in 4 cases,^{17,20,21,30} with a cure reported in 2 cases,^{21,30} a fair result in 1 case,²⁰ and no improvement in the fourth.¹⁷ It is of interest that 2 cases which were "cured by splenectomy" had an associated purpura and were reported by the same authors. One case²¹ had

purpura with an associated low platelet count before splenectomy. The other case³⁰ had purpura without thrombocytopenia, and splenectomy was done because of the evidence of increased vascular fragility.

PROGNOSIS

The prognosis for patients with idiopathic pulmonary hemosiderosis must be considered as grave since only 15 of the 41 cases reported were surviving at the time of the report, and in 10 of these more than 1 episode had occurred. During periods of remission, the patients got along fairly well, although usually complaints of growth failure, fatigue, and dyspnea were registered.

SUMMARY

Although pathologically segregated in 1931, idiopathic pulmonary hemosiderosis as a clinical entity was first named and diagnosed in 1940. The clinical roentgenologic and pathologic features of this disease are distinctive. Hemosiderin deposition is confined to the lungs and is not a function of a generalized disturbance in iron metabolism or blood dyscrasia. Whatever the primary defect, hemorrhage is believed to occur by diapedesis into the alveoli with resultant deposition of hemosiderin.

Significant pathologic changes are confined to the lungs which show a pneumonic hepatization, diffuse pulmonary fibrosis, and fragmentation of elastic fibers in both the alveolar walls and pulmonary vessels. Alveolar spaces and walls are crowded with macrophages bearing hemosiderin.

Recurrent attacks in childhood with sudden onset of tachycardia, cyanosis, dyspnea, and pallor suggest heart failure. Recovery may take place in a few days, but poor exercise tolerance, pallor, and physical retardation may remain.

The roentgenographic findings are characteristic and show mottled shadows with diffuse speckling throughout the lung fields. These changes become accentuated during exacerbations and the pulmonary changes are progressive until death occurs. Although the roentgenologic findings must be differentiated from such conditions as silicosis and miliary tuberculosis, no other disease is believed to produce during childhood such diffuse shadows and mottled distribution throughout both lung fields independent of the borders of the lobes.

Hypochromic anemia and evidence of hemolysis are believed secondary to pulmonary hemorrhages. Primary cardiac pathology is absent.

Helpful diagnostic features include: (1) the clinical picture of cardiac failure with little evidence of primary cardiac pathology, (2) frequent icterus with urobilinuria and occult blood

in the stool from swallowed blood in the sputum, (3) severe anemia with some evidence of red cell destruction and regeneration and no evidence of a generalized hemolytic anemia, (4) no evidence of a blood dyscrasia, (5) characteristic x-ray findings of the lungs, (6) identification of macrophages loaded with hemosiderin from smears and section material of sputum, and (7) examination of cervical nodes for proliferation and hemosiderin. Waldenström³⁴ states:

"Final diagnosis must be based upon x-rays even if the relapsing nature of the disease with small hemoptyses

containing iron-laden cells and a hypochromic anemia with increased hemolysis should make diagnosis sure."

The pathogenesis of this disease is unknown. Various hypotheses have been reviewed and reference is made to Strassmann's⁵⁰ experimental production of the condition in rabbits. A synopsis of the 40 cases found in the literature has been included and 1 new case history presented.

The condition is probably not as rare as the paucity of reports suggests. Many cases are from Europe and the influence of Waldenström's reports on nearby clinics is noticeable.

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An Oral Therapy (Bonadoxin Drops) for Infant Colic and Pylorospasm

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PAROXYSMAL FUSSING or infantile colic is one of the earliest somatic responses to environmental tension. Intensity of the infant's reaction may be determined in part by constitutional factors, but the exact etiology is unknown.

Increasing numbers of infants with hyper-irritability and convulsive seizures but without other signs of illness or laboratory evidence of organic disease have been reported. The onset is often insidious with a gastrointestinal phase marked by irritability, wakefulness, excessive responsiveness to noise, and regurgitation after feeding. Episodes of crying, stiffening of the body, extension of the head, staring, and periods of eye-rolling are usual. Frequent, brief, generalized convulsive seizures had occurred in the majority of reported cases.

The literature on infant colic¹ records 4 etiologic theories, ascribing the condition variously to (1) hypertonicity; (2) allergy; (3) physiologic immaturity of the intestinal tract;² and (4) parental tension. The 4 hypotheses suggested to the author that a combination of meclizine and pyridoxine (vitamin B₆) might have specific value in at least 3 of these factors and would be contraindicated in none.

In a study³ of new antiemetic preparations for children, the only side reaction noted with meclizine was drowsiness. Early clinical trials with Bonadoxin^{4,5} revealed the effectiveness of these tablets in preventing and treating hyperemesis gravidarum and confirmed its freedom from side effects. Colombo and Calligari⁶ used a combination of antihistaminics, corticoids, and pyridoxine to control postanesthetic vomiting, which they noted was reduced by pyridoxine alone. They called attention to the probability that anticholinergic action inhibits vomiting.

Pharmacologically,⁷ meclizine (1) protects guinea pigs against tenfold M.L.D. doses of intravenously injected histamine; (2) prevents, for extended periods, bronchospasm in guinea

pigs exposed to aerosol-administered histamine; and (3) has antispasmodic action *in vitro* on induced spasm of isolated guinea pig ileum. Meclizine has a definite anticholinergic effect. Toxicity studies, both chronic and acute, revealed a broad margin of safety between therapeutic and toxic levels.

The necessity for pyridoxine in infant nutrition has been well documented. Coursin⁸ reported that 54 infants fed a pyridoxine-deficient formula became irritable and had abdominal distress and convulsive seizures until pyridoxine was added to the diet. Hansen and Wiese⁹ found that pyridoxine deficiency in infants causes nervous system abnormalities. They also reported that the pyridoxine requirement varies with the individual.

Bonadoxin Drops, a lime-flavored liquid containing the same ratio of meclizine and pyridoxine that is found in Bonadoxin tablets, was given to 25 infants ranging in age from 2 weeks to 9 months (3 cc. Bonadoxin Drops is equivalent to 1 Bonadoxin tablet, which contains 25 mg. of meclizine and 50 mg. of pyridoxine). Dosages varied from 5 drops before meals to 15 drops every four hours. Medication was administered to 8 children for a week or less; to 11 for eight days to three weeks; and 6 are continuing the drug.

For evaluation of the results, *excellent* indicated dramatic improvement with no recurrence of symptoms. *Good* meant successful management with complete relief, ease, and ability to rest while remaining on medication. *Fair* meant some relief with occasional periods of distress. *Poor* indicated no relief of symptoms.

RESULTS

Bonadoxin Drops was effective in 22 of 25 infants with colic and pylorospasm; improvement was dramatic in some. No side effects were observed. The preparation was accepted and tolerated by all infants. Flexibility in regulating the dosage permitted upward adjustment, in several instances, for better management of intestinal complaints. All the children seemed to

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like the taste of the lime-flavored preparation.

The series was evaluated as follows: excellent 5, good 12, fair 5, and poor 3.

Of interest is the fact that one poor result occurred in the child of an extremely tense, nervous mother. Another result was poor in an infant previously on atropine and subsequently on antihistamine. A child with severe colic and profuse vomiting exhibited one of the best results. In some of the infants, the meclizine-induced relaxation increased the ability to rest. No side reactions were observed.

CONCLUSIONS

The lime-flavored meclizine-pyridoxine preparation used in this study appears to be of distinct value in treatment of infant colic, with the definite advantages for home administration of oral acceptance, palatability, and tolerance. The author believes that the therapy may yield better results as experience with dosage schedules accumulates.

Bonadoxin Drops are supplied by J. B. Roerig & Company, Div. of Chas. Pfizer & Co., Inc., Chicago.

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REPEATED determinations of plasma fibrinogen levels should be made for all patients with partial or complete abruptio placentae, state E. Stewart Taylor, M.D., and Harold M. Haugen, M.D., University of Colorado, Denver.

At the time of placental separation, thromboplastin is liberated from the placenta into the general circulation, causing formation of intravascular fibrin thrombi and widespread plugging of precapillary tissues. Blood supplies of fibrinogen may be exhausted, causing a hemorrhagic tendency. The extent of placental separation determines the degree of hypofibrinogenemia. Postpartum hemorrhage is also a manifestation of fibrinogenopenia.

Abruptio placentae should be suspected when external bleeding occurs, especially if fetal heart beat is altered or lacking and localized uterine tenderness exists. If the diagnosis is confirmed by vaginal examination, the membranes are ruptured to immobilize the placenta, prevent further blood loss, and relieve intrauterine pressure. Blood is transfused freely. With partial separation, oxytocic stimulation is started or cesarean section is performed if labor does not begin within two hours after amniotomy. With complete abruptio placentae, treatment is directed to control of maternal hemorrhage; surgical delivery is performed if labor does not ensue within two to four hours.

Plasma fibrinogen levels should be determined immediately and the clot observation test should be performed hourly until delivery. If fibrinogen levels are normal, a stable clot will form within four or five minutes after 5 cc. of blood drawn from a vein is placed in a dry test tube. With hypofibrinogenemia, either blood fails to clot or the initial clot dissolves within an hour.

Hypofibrinogenemic patients are given 2 to 6 gm. of human fibrinogen and whole blood is transfused in quantities sufficient to replace blood loss and to combat shock. Fibrinogen adequacy is assessed by repeated tests for clot formation and stability.

E. STEWART TAYLOR, and HAROLD M. HAUGEN: *J. Iowa M. Soc.* 45:600-605, 1955.

Treatment of Burns

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A TREMENDOUS INTEREST has arisen in the past ten years regarding the management of the burned patient. Much of this concern was stimulated by World War II when burn casualties were frequent and presented problems both of immediate and late care. The National Research Council and United States Army, Navy, and Air Force hospitals and research centers have directed much of their efforts to the study of all phases of burn care, both of the burned area itself and the nutritional, metabolic, and other physiologic problems posed by the severe burn. While in some ways the care of a burn has been simplified and rationalized, the physiologic studies often encompassing one small phase of the problem can be very confusing. Out of the tremendous amount of postwar literature on burns, a few well-established principles can be drawn and one important fact stands out, namely, that the care of a severe burn cannot be left to Providence and a reluctant intern. Burns require the intelligent attention of a clinically-minded surgeon who is willing to devote personal time to them. No amount of laboratory work and philosophic discussion can replace the conscientious surgeon and clinical judgment.

Burns at best are difficult cases to care for and the temptation is to take any possible short cut offered and to delegate their care to others as far as possible. A serious burn, however, requires the constant attention of the surgeon himself. He cannot simply order blood chemistries and "adequate fluids," but he or his associate must insist on hourly observation during the first forty-eight hours. This aggressive attitude must be taken not only in regard to general care, but also in regard to local care, since the two go hand in hand. Aggressive care must obtain throughout all phases of treatment; initially, on the patient's admission; later, during the period of impending shock or shock, that is, the early phase of physiologic imbalance, then immediately after subsidence of shock when special care must be given to the patient's nutritional, elec-

trolyte, and blood state in order to minimize the severe protein and red-cell deficiency which may occur. By the seventh to the eighth day, or sooner, the surgeon must plan to remove slough and to cover raw surfaces with skin as quickly as possible. Our goal is to complete grafting by the third week. If loss is too great, this early coverage is not possible, but grafting should be started by this time.

After the burn heals, a third phase of care may demand the surgeon's attention: namely, scar excision, release of contractures, and rehabilitation. Many physicians have emphasized the psychologic changes which patients with severe burns manifest. No doubt, this situation can be difficult, and undoubtedly a psychiatrist would be of great assistance at such a time. However, it is largely up to the surgeon to practice his own psychiatry when caring for the burned patient. If the surgeon gains the patient's cooperation and trust and takes a real interest in his patient's welfare and rehabilitation, then the services of a psychiatrist are seldom required.

I should like to consider particularly the local phase of burn care with some observations on general management, since the two are inseparable. I shall not go into the complicated blood chemistry studies of burns, partly because their significance seems to change from year to year, but for the most part, because I do not understand them very well myself.

The plan of care which I shall outline does not require an excessive amount of laboratory work nor blood chemistry studies. Obviously, much of our treatment of the physiologic disturbance is based on careful research, but, in practice, this research need not be repeated in every burn case. Our feeling has been that observation of the clinical course is the most important feature in burn care and is too often neglected in favor of repeated laboratory examinations. As Dr. Harvey Allen once wrote, "A flame photometer cannot replace a conscientious surgeon."

Burns are open wounds and, as such, are characterized by tissue destruction and damage, and the body surface is open to bacterial invasion. In addition, there are also certain physiologic

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changes, characterized by loss of circulating blood volume caused by shifting of body fluids and later to chemical imbalance, if this volume loss is not quickly corrected. Loss or destruction of red-blood cells also occurs, which leads to secondary anemia, often in spite of corrective efforts. Associated with the severe burn are also protein and fluid loss, much of which occurs from the burned surface itself and which continues as long as the surface remains open.

In the slight burn, which covers less than 15 to 20 per cent of body surface in the ordinarily healthy individual, these physiologic disturbances are corrected by the patient's own physiologic mechanism, providing he eats and drinks normally. With burns of greater extent, however, and in burns of lesser extent in the very young and the very old, spontaneous correction cannot be expected and help is required.

Studies of large series of burn patients, with fluid and other requirements well met, have shown that complications and death in over 50 per cent are due to infection. It is with this in view as well as correction of physiologic disturbances that we address our care of the burn.

The indications in burn management are, therefore, to care for the burned surface and concomitantly to treat the general disturbances which may be associated with burns. Both aspects of burn care must proceed together, not just in the initial stage but at all stages, since each complements the other. Usually all that can be done when the burn first occurs is to carry out measures designed to prevent the development of infection. The management of the physiologic disturbances should likewise be directed toward prevention.

We can illustrate these general principles by describing the steps to take in the treatment of a severe burn.

The patient with a severe burn should be brought to a well-equipped hospital as soon after injury as possible. The burn itself should have been simply covered with a sterile dressing, if available, or a clean cloth. The natural tendency, both on the part of the patient and the physician, is to apply some sort of ointment, grease, powder or other substance on the burned surface to relieve pain. Actually, almost anything applied is harmful and makes later care more difficult, serving only to keep out the air. This purpose is accomplished by a dry, sterile dressing or clean cloth, which causes no complication in future care.

If the burn covers more than 20 per cent of the body surface and the trip to the hospital requires more than three or four hours, a plasma

expander should be started (plasma itself, if virus free) in order to control the diminishing blood volume which is apt to develop in serious burns. For a brief trip of one or two hours, such precaution is not absolutely necessary but is of real value.

On admission to hospital, the seriously burned patient is taken immediately to the operating room, emergency room, or large dressing room where strictest asepsis can be secured. The room should be warm and protected from draft. Abundant supplies of dressings, sterile water, physiologic saline, and a few sterile surgical instruments are necessary. All occupants of the room should wear caps and masks, including the patient, unless the face is involved.

Upon arrival in the room, the patient is quickly assessed concerning the need for immediate administration of intravenous fluids. A needle or plastic cannula is introduced into a vein, blood is withdrawn for typing, hematocrit, and hemoglobin and protein determination, and fluids are started.

In the meantime, the patient's clothes are removed and he is placed on a sterile sheet preparatory to cleansing the burn and estimating its extent.

A Foley catheter is introduced into the urethra and the first urine sample withdrawn for examination. Thereafter, urine is measured each hour.

Ordinarily, as soon as the patient is brought into a warm, draftless room, the pain ceases. Actually, patients with extensive burns do not complain of a great deal of pain after the first instance. If sedation is given, morphine should be administered in a small dose intravenously rather than subcutaneously, since peripheral absorption may be very slow. Also, when peripheral circulation improves, large subcutaneous doses of morphine may be rapidly absorbed, leading to morphine poisoning.

An anesthetic is never necessary for the purpose of preparing the burned area. Children may occasionally require a barbiturate rectally. Patients rarely complain of pain or discomfort during wound preparation, if the solution is warm and the room is without drafts.

I feel that the local preparation of the burn is of great importance. Infection is becoming increasingly recognized as an important cause of complications that arise from burns. Many of the manifestations of burns occurring after the initial "shock phase" are undoubtedly due to absorption of toxic bacterial products rather than to some hypothetic but as yet unidentified "burn toxin." The surface of the burn is not, of course, sterilized by the burn, clothes, and other sub-

stances. Charred debris and other soiled particles are sure to be present and an attempt should be made to remove as much of this contamination as possible.

The area is cleansed with warm soap and water and irrigated with large amounts of normal saline solution. This burned surface is not actually scrubbed with a brush, as many seem to think, but is washed gently and carefully, under strictly aseptic conditions. The "washers" are themselves surgically scrubbed, masked, and capped and wear cap and gown and rubber gloves as for any other operation. For extensive burns, time is conserved if several persons wash the burn.

After washing and rinsing, the surgeon changes gown and gloves and proceeds to derroof blisters and to remove all desquamated skin tags. The burn is *not excised*; the object at this time is simply to remove loose tags and blisters. Immediate excision of a burn, while ideal, would apply only to slight burns definitely localized in patients whose condition would withstand an anesthetic.

The burn is then covered with a single layer of fine mesh gauze very lightly impregnated with petrolatum. In fact, the area should seem almost dry. Too often the burned surface is covered with a thick, impervious coating of petrolatum as if the substance contained some curative element. Actually, dry, fine mesh gauze next to the wound surface is satisfactory, and the petrolatum can be omitted entirely. Over the initial layer of fine mesh gauze is laid a large compression dressing consisting of many thicknesses of dry, resilient gauze or cellucotton. Cotton rolls should not be used as they become hopelessly matted and are extremely difficult to remove. Fluffed gauze is satisfactory as are abdominal pads. A very thick and absorbent dressing is the main requirement. Prefabricated burn dressings in several sizes may be secured or made up by hospital personnel and are extremely useful for extensive burns. A good supply should be kept on hand in the emergency room to facilitate rapid dressing.

The dressing should extend well above and below the site of the burn and should be snugly bandaged with even, resilient pressure, taking care to avoid constrictions. The extremities are splinted. The hand is splinted in the position of function under compression on a suitable splint. The fingers should be kept separated by gauze to prevent maceration. Similarly, if the foot is dressed, the toes should be kept separated and extra padding placed above the heel to guard against pressure on the os calcis.

The perineum is impossible to dress with a pressure dressing. This region is dependent upon constant cleanliness. Local resistance to bacteria is great in this part of the body.

The head, neck, and face may be dressed in compression, although many surgeons prefer to leave these areas open. I prefer to dress them, unless there is some real contraindication for doing so. Occasionally, a tracheotomy may be required as in burns of the upper respiratory tract and face which would prevent the use of a compression dressing on the neck.

In case of scalp burns, it is advisable to shave the head in order to secure a moderately clean surface.

At this time, tetanus protection is given and decision is made concerning the need for antibiotics. Certainly, very extensive burns should receive antibiotics—usually generous doses of penicillin. Burns involving the face, perineum, and axillae, even if of slight extent, should receive antibiotics. Burns involving small areas in other parts of the body probably do not require antibiotics.

The freedom with which antibiotics are administered for burns seems to me to indicate the general feeling of the profession concerning the factor of infection in these wounds.

During the cleansing and dressing of the burn, the surgeon attempts to estimate its depth and extent for use as a rough guide for fluid therapy. An absolutely accurate measurement cannot be made at this time. In fact, the depth of a burn is not always possible to ascertain even after six or seven days. Likewise, the extent of the burn is not always apparent right away, and the surgeon frequently finds that unsuspected areas appear later. However, a sufficiently accurate "guess" can be made to indicate in a general way the magnitude of the problem, which is used as an index to amount of fluids required.

The patient is moved to his room after application of the dressings with a Foley catheter in place and fluid running in by vein. The first twenty-four to forty-eight hours are extremely important, and the patient's chances of immediate or eventual survival often depend on constantly changing tactics with the vicissitudes of the problem. Chemical determinations and various laboratory aids may be helpful but by far the most important factor is the reaction of the patient himself. Restlessness and complaints are more often caused by inadequate fluid intake than by pain. Nausea and vomiting may indicate need for intravenous fluids as does severe thirst. Collapse of peripheral veins means shock regardless of blood pressure readings.

A tentative estimate of fluid requirements may be made by utilizing the Evans formula. By this formula, the percentage of burned area is multiplied by the patient's weight in kilograms. The figure obtained is the number of cubic centimeters of blood and/or plasma needed in the first twenty-four hours. In addition, an equal amount of an electrolyte solution is administered. Some physicians feel that this amount of electrolyte solution is too much and prefer instead to give more blood and/or plasma or plasma expander. Besides this figure, the ordinary fluid requirements — about 2,000 cc. — are necessary for normal body fluid loss from lungs, skin, stool, urine, and so forth. This amount may be given intravenously as glucose solution or, if the patient tolerates it, by mouth.

The consensus of feeling among those who handle large numbers of burned patients is that whole blood should be used in fairly large amounts from the start. Whole blood does not seem to elevate the already high hematocrit, and large amounts of whole blood administered early are believed to minimize or at least favorably affect the secondary anemia which so often occurs. We like to administer about equal amounts of blood and plasma or plasma expander, if virus-free plasma is not obtainable.

The urinary output is a most valuable guide to the adequacy of fluid intake. Effort is directed toward keeping urinary output, as measured from the catheter, at 25 to 50 cc. per hour with a specific gravity of about 1.016.

Guides to the patient's progress should be the hourly observations during this critical initial period. The hematocrit is of value, but probably the appearance of the patient and the urinary output is of more importance. Thirst, restlessness, and vomiting are usually indicative of the need for more fluids.

During the second twenty-four hours, the patient generally requires about one-half as much blood and plasma as during the first twenty-four hours. The 2,000 cc. for excretion balance remains about constant. By this time, the patient can probably take his supplementary fluids by mouth and, if so, so much the better. He might at this time also begin to eat. His diet, however, should be started cautiously lest nausea be induced.

Dressings are not disturbed but are inspected from time to time and are tightened if they become loose. If saturation occurs, fresh pads are bandaged over the dressings.

At the end of forty-eight hours, diuresis occurs and the intravenous administration of plasma may be discontinued. From now on, fluids

need to be administered only in quantities sufficient to take care of ordinary physiologic needs. The catheter may be removed and particular attention is now directed toward keeping up the patient's protein and caloric intake. Transfusions, however, should be given every other day, or every third day in severe burns, for several weeks in attempts to minimize anemia and also to combat protein deficiency.

A diet high in calories of from 3,000 to 4,000 or occasionally more with a protein intake of 150 to 200 gm. should be started as soon as possible. The need for high protein intake is evidenced by the drop in blood proteins and often by a reversal of the albumin-globulin ratio. The sooner the patient can be put on a good diet or even nasogastric feedings, the less the protein deficiency is apt to assume serious proportions. Early aggressive attention to this dietary need is of great importance and may prevent severe nutritional imbalance or at least minimize this imbalance and render its correction somewhat easier. Large amounts of multiple vitamins should be administered with the diet. Interval feedings of some protein hydrolysate with eggs, milk, and sugar assist in raising food intake to the desired level.

The initial dressings are not disturbed for five to eight days over areas where full-thickness loss is anticipated. Obviously, partial-thickness burns may be left for ten days or so without dressing change, at which time they are found healed. Burns of the face, unless of third degree, are usually well on the way toward healing by the fifth day, and, if they have been treated by compression, our practice is to remove the dressings on the third or fourth day.

At time of removal of the dressings, the surgeon may secure a more accurate estimate of the severity of the burn and determine the need for slough excision and skin grafting. At this first dressing, the gauze is removed down to the initial layer of fine mesh gauze. Areas of full-thickness loss may then usually be diagnosed either by the black, charred, hard skin or frank areas of necrosis with beginning separation about the edges. Even at this time, the full extent of deep loss may not be evident and a "second look" may be necessary. Whatever the finding, a compression dressing is reapplied, unless healing has been complete.

Burns of partial-thickness loss heal spontaneously in fourteen to eighteen days, but, if full-thickness loss is present, plans should be made at this time for removal of these areas and for skin grafting. The problem then arises of how this removal is to be accomplished. If the com-

plete loss is quite small and spotty, the slough may be allowed to separate spontaneously under dressings every other day. Dakin's solution or moist saline dressings often hasten the process.

If separation requires more than a week or ten days under this management, a more aggressive attack on the slough is indicated. Various enzymes and other substances have been tried and are being used for this purpose, and it is to be hoped that some such agent will one day be discovered to remove burn slough rapidly. Spontaneous or enzymatic removal of the thick, leather-like patches of skin of slough, however, is at best a slow process, often painful, and may be very costly. A real disadvantage of the slower methods is that the wound remains open resulting in a continuing loss of fluid and protein from the surface.

The slough may be removed more rapidly and sooner by surgical excision under an anesthetic. Such excision is never necessary on the head and neck where spontaneous separation occurs quite early. Excision is always indicated on the hands where early closure is of the greatest importance for future function. Elsewhere on the body, excision is the quickest way of early slough removal, least time consuming, less trying on the patient, and offers earliest closure of the burn. Closure is our best insurance against repeated secondary contamination.

Burn excision is neither an easy nor simple procedure in case of burns of any extent. A general anesthetic is required and blood must be on hand for transfusion, since some loss of blood occurs. Burns are never evenly and easily placed for excision. During operation, the patient must be placed in difficult positions which require changes. Plenty of help is required at this time to facilitate and hasten the necessary changes in position. The actual removal of the slough is not easy, since excision is not involved as much as removal through the area in which nature is attempting to separate the dead tissue. Even at this time, the extent of the full-thickness loss is not always apparent and occasionally a second excision is needed. Nevertheless, excision, if performed properly with adequate help and equipment, is a most valuable procedure.

The surface left by excision is covered immediately with compression dressings, omitting at this time the petrolatum gauze. Skin grafting is

not carried out at the time of excision for several reasons. The surface is moist and bleeding, and grafts are likely to pull away. Also, one hesitates at this time to handle the patient further and add to the blood loss which graft removal entails. An exception to this rule are the hands, which may often be grafted profitably at time of excision.

Skin grafting may be carried out two or three days after excision. If the surgeon has not been entirely satisfied with his excision, he may wish to inspect the burn two days after excision and possibly dress it once before skin grafting. A second burn excision may even be necessary. More often, however, grafting can be undertaken two days after excision. The surface at this time is not granulated and takes grafts well.

Burns of very great extent may require more than one skin grafting because of lack of sufficient donor sites. The same site may be used again in three weeks, providing the layer of skin removed at first grafting was not too thick.

The use of homografts, fresh, or cadaver grafts, as advocated by Brown, may prove lifesaving in very extensive burns in patients whose condition does not permit operative procedures and in whom donor areas are scanty. It should be remembered that these homografts are simply biologic dressings and will not survive and furnish permanent cover. They eventually disintegrate and must be replaced with autogenous grafts. In the meantime, however, the patient's condition can be improved and his nutrition adjusted.

This article does not, of course, tell the whole story of burn care. Many special areas could be discussed. Even after the burn has healed, the final rehabilitation of the patient must be considered, both physically and psychologically. After the burn has healed, scars and contractures may require revision and more suitable surfaces provided for areas which were in the first instance, perforce, covered with thin skin. If, however, rapid healing has occurred, these secondary procedures are more easily accomplished and with much better end results than if deep scarring is permitted to develop by allowing granulations to accumulate. Likewise, the psychologic rehabilitation of the patient is rarely a problem if early healing has occurred and if the surgeon has taken an active interest in the patient and his problems.



Archie D. McCannel, M.D.

*Acknowledged High Priest and
Most Able Practitioner*

By ROBERT CORY

IN FORTY-NINE YEARS of civic work in Minot, Dr. Archie D. McCannel has been given so many titles that one more won't be too many.

Why not invent a title for him that will cover all the others, and exemplify the many things that Dr. Archie stands for in the civic and promotional circles of Minot?

So we name him, respectfully — Acknowledged High Priest and Most Able Practitioner.

How complimentary a title this is and its meaning, we hasten to explain. Judged in a dozen categories, Dr. McCannel has come to be regarded as Minot's foremost citizen.

Why do we say he is the city's exponent, high priest, and ablest practitioner? Dr. McCannel is — we say — the man whose prestige, gained through devoted practice, hard work, and countless committee meetings, entitles him to be called Acknowledged High Priest and Most Able Practitioner.

His everlasting and alert effort has been responsible for organizing, promoting, and carrying to completion all kinds of community improvements commensurate with the city's growth.

He began by sweeping out and building the fires in the old Presbyterian Church before the present, but soon to be vacated church, was built.

His energies then started brooms sweeping in many directions. It would take several more pages just to summarize the highlights of his civic, fraternal, and philanthropic activities, not to mention professional activities.

When an ambitious young business or professional man comes to Minot and decides he wants to stay and grow with the city, someone is sure to say to him, "See how Archie McCannel has done; see how he gives the community untiringly of his talent, his time, and his money."

If asked about his current civic responsibilities, he insists that he is "very much retired." Yet he serves as a member of the State Board of Higher Education, as he has since 1945. He presides at meetings of the Minot Y.M.C.A. board, having recently been re-elected its president. Dr. McCannel was one of the organizers of the Y.M.C.A. and one of the circle of men who saw the "Y" through its fund-raising and initial construction program. He is chairman of the board of directors of the First National Bank, with which he has been identified actively for many years. He is an active elder on the Session of First Presbyterian Church, where it is conceded that no layman equals him in number of hours devoted to church work.

Retired? Yes, in terms of activities he has sloughed off in recent years. But most men would not consider themselves retired with the load of responsibilities he continues to shoulder.

For thirty years, through the periods of two World Wars and the nation's greatest depression of modern times, Dr. McCannel was chairman of the Ward County Chapter, American Red Cross. He helped organize Red Cross chapters in the counties surrounding Minot where none had existed prior to the first World War. In the period of the 1930's when the Red Cross had a widespread general disaster on its hands in North Dakota, his counsel was sought by national and area Red Cross representatives. Through World War II he served and retired in September 1947.

From the time of the formation of the Great Plains area council, Boy Scouts of America, he was active in the scouting movement and served as council president. He received the coveted Silver Beaver Award for outstanding service to boyhood.

As a Mason he has pursued both the York Rite

and Scottish Rite branches. He is a past grand commander of the North Dakota Commandery of Knights Templar. In 1936 he was Master of Kadosh of the Minot Consistory. He has attended many international gatherings of Masons.

One of his major interests through the years has been the Minot Rotary Club and Rotary International. In Rotary he is a past district governor of the ninth district. Three times he has been a delegate to conventions of Rotary International: at Toronto in the early years, in Belgium in 1947, and the third time at Rio de Janeiro in 1948.

Always an exponent of international good will, Dr. McCannel in his civic, professional, and fraternal activities may well have attended more international conferences than any other citizen of Minot.

He has traveled to Europe several times. On one memorable occasion, when he went to Vienna in 1911 and 1912 for postgraduate study, he and Mrs. McCannel changed their ship reservations and so missed going down on the Titanic. Taking the *Carmenia* instead, they arrived in New York on April 15 and read newspaper accounts of how the Titanic had sunk on the preceding day. On his return to Minot, the late William Hetherington, a Scottish pioneer of Minot told him: "Your time had na come."

For thirty years, Dr. McCannel has also served on the board of trustees of Jamestown College at Jamestown and in 1954 was awarded an honorary Doctor of Science degree.

His first state office, to which he was elected in 1918, was member of the State Board of Medical Examiners. He served on the board until 1946 and became its president in 1943.

When the North Dakota public welfare board was organized, he was one of its members. At a time when many in his profession were still antagonistic toward the Social Security Act, he went before the state medical convention and told his brother medics that it was time they began working with the Act as the law of the land, instead of against it.

Next he was appointed to the State Board of Higher Education, on which he still serves. As the only physician member of that board, he is credited with having helped shape the reorganization of the College of Medicine at the University of North Dakota along modern lines.

This native of Chesley, Bruce County, Ontario, whose father was Scottish and his mother Irish and English, seemed destined to follow his ancestors westward. He finished high school at Harriston, Ontario, then attended the University of Toronto and the Toronto College of Pharmacy.

As a young druggist, he came in 1901 to the mushrooming prairie village of Richburg, which was later merged with Westhope in western Bottineau County, North Dakota. He opened a drug store there.

He liked the country, made some lasting friendships, and saw Minot for the first time. He made a note of the fact that Minot needed an eye, ear, nose and throat specialist.

So he hustled back to Ontario, in June of 1902,

to take an appointment as pharmacist and buyer for the Hospital for Sick Children in Toronto and held this position while studying medicine.

Completing his medical course in 1906, he returned to Westhope and practiced for a time with Drs. Durnin and Durnin but left in a matter of months for London, England, to study at Moorefield's Eye Hospital.

In the fall of 1907, he went directly to Minot, took over the practice of Dr. Carl Klemmer who had recently died in Berlin, Germany, and began his career as a medical specialist. He organized the McCannel Eye, Ear, Nose and Throat Clinic in 1922.

Before he retired from active medical practice in 1953, Dr. McCannel had served professional organizations in his field with distinction. He was one of the founders of the North Dakota Academy of Ophthalmology and Otolaryngology. From 1948 to 1953, he was a national counselor for the American Academy of Ophthalmology and Otolaryngology. He was president of the North Dakota State Medical Society in 1936. A life member in the American College of Surgeons, he had served as governor at regional meetings of the College.

Deserving mention too is the fact that both of his sons have followed the medical profession with success. Dr. Donald A. McCannel is a specialist in urology in Beverly Hills, California, and Dr. Malcolm McCannel is practicing ophthalmology in Minneapolis.

Dr. McCannel's helpmate for forty-eight years, his wife, "Vi," nee Violet Rose, was a London, Ontario, girl who was a nurse in the children's division of the Toronto Hospital when he met her. They were married in 1908. In addition to their two sons, they have two daughters, who both live in North Dakota — Mrs. Lawton E. Osborn of Dickinson and Mrs. Gordon Aamoth of Fargo.

Don't think for a minute the patients weren't streaming in from far and near to the waiting room of the McCannel clinic in the years when Dr. Archie was busiest in civic affairs. They came not only for glasses and tonsillectomies, but for such things as harelip surgery, eye surgery, removal of cataracts, mastoid operations, sinus drainage, and, last but not least, removal of foreign bodies from the larynx, trachea, bronchial tubes, and esophagus.

In spite of such an active pace, Dr. Archie always seemed to have time to talk to business visitors about things they regarded important. In addition, he found time to prepare a research paper and illustrated lecture on peroral endoscopy — his specialty within a specialty — which he gave at a convention of the Canadian Medical Society in Victoria, British Columbia in 1936. At present, he is gathering material, photographs, and data in order to publish a volume on "Milestones in North Dakota State Medicine." The book is to be dedicated to the wives of the medical profession.

A man with such boundless energy can't let down to the state other men call retirement. Of course, when a man is Acknowledged High Priest and Most Able Practitioner, there are always things to be done.

Program of the Seventy-fifth Anniversary Meeting of the North Dakota and South Dakota Medical Association

THE MEETING will be held June 3 through 6, 1956, in Aberdeen, South Dakota, to commemorate the seventy-fifth anniversary of the founding of the first medical society in Dakota territory. Both the Council and the House of Delegates will meet at this time in Aberdeen.

SCIENTIFIC PROGRAM

Monday, June 4

F. DANIELS GILLIS, *Chairman*

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| 9:00 A.M.—9:30 A.M. | Film (subject to be selected) |
| 9:30 A.M.—10:00 A.M. | <i>The Pathologist's Responsibility in the Diagnosis and Treatment of Cancer</i> , LAUREN V. ACKERMAN, M.D., Washington University, St. Louis |
| 10:00 A.M.—10:30 A.M. | <i>Roentgen Diagnosis of the Acute Abdomen</i> , ROGER A. HARVEY, M.D., University of Illinois |
| 10:30 A.M.—11:00 A.M. | Recess to view exhibits |
| 11:00 A.M.—11:30 A.M. | Speaker—ARNOLD S. JACKSON, M.D., Jackson Clinic, Madison, Wisconsin |
| 11:30 A.M.—12:00 NOON | <i>Diseases of the Thyroid</i> , GEORGE CRILE, JR., M.D., Cleveland Clinic, Cleveland |
| 12:00 NOON—1:45 P.M. | Noon luncheons (Radiology, Surgery, EENT) |
| 2:00 P.M.—2:30 P.M. | <i>Respiratory Emergencies in Newborn and Early Childhood</i> , ALDEN H. MILLER, M.D., Los Angeles |
| 2:30 P.M.—3:00 P.M. | <i>Changing Concepts in the Surgical Treatment of Cancer</i> , GEORGE CRILE, JR., M.D., Cleveland Clinic, Cleveland |
| 3:00 P.M.—3:30 P.M. | Recess to view exhibits |
| 3:30 P.M.—5:00 P.M. | Cancer Forum—Chairman, ELMER HESS, M.D., President, American Medical Association. Participants—LAUREN V. ACKERMAN, M.D., pathologist; ROGER HARVEY, M.D., radiologist; and ARNOLD S. JACKSON, M.D., surgeon. (Presented in cooperation with the North and South Dakota chapters of the American Cancer Society) |
| 5:45 P.M.—6:45 P.M. | Relaxation at the Sherman Hotel |
| 7:30 P.M.—9:00 P.M. | Banquet followed by public meeting. Address by ELMER HESS, M.D., President, American Medical Association |

Tuesday, June 5

Chairman to be selected

- 9:00 A.M.—9:30 A.M. Film (subject to be selected)
- 9:30 A.M.—10:00 A.M. (Subject to be selected), WILLIAM F. MENGERT, M.D., University of Illinois
- 10:00 A.M.—10:30 A.M. *Dermatologic Use of Steroids*, FRANCIS W. LYNCH, M.D., University of Minnesota
- 10:30 A.M.—11:00 A.M. Recess to view exhibits
- 11:00 A.M.—11:30 A.M. *Tuberculosis and the Physician in General Practice*, J. A. MYERS, M.D., University of Minnesota (courtesy of South Dakota Tuberculosis and Health Association)
- 11:30 A.M.—12:00 NOON (Subject to be selected), WALTER L. PALMER, M.D., University of Chicago
- 12:00 NOON—1:45 P.M. Noon Luncheons (GP, Medical, and Ob. and Gyn.)
- 2:00 P.M.—2:30 P.M. *Diabetes Mellitus with a Discussion of the Newer Types of Insulin*, E. H. RYNEARSON, M.D., Mayo Clinic
- 2:30 P.M.—3:00 P.M. *Evaluation of Newer Surgical Techniques for Congenital Malformations of the Heart*, PAUL ADAMS, M.D., University of Minnesota
- 3:00 P.M.—3:30 P.M. Recess to view exhibits
- 3:30 P.M.—4:00 P.M. *Foot Problems Amenable to Surgical Treatment*, MARK COVENTRY, M.D., Mayo Clinic
- 4:00 P.M.—4:30 P.M. *The Respirator Center and Rehabilitation*, WILLIAM A. SPENCER, M.D., Jefferson Davis Hospital, Houston, Texas. (Courtesy National Foundation for Infantile Paralysis)
- 4:30 P.M.—5:00 P.M. *Surgical Treatment of Hydronephrosis*, FREDERIC E. B. FOLEY, M.D., St. Paul
- 8:30 P.M. Mixer for doctors and their wives. GEORGE TONAK featured at the piano.
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Wednesday, June 6

Chairman to be announced

- 9:00 A.M.—9:30 A.M. Film (subject to be selected)
- 9:30 A.M.—10:00 A.M. *Precancerous Lesions of the Colon and Rectum*, WALTER A. FANSLER, M.D., and C. A. NEUMEISTER, M.D., University of Minnesota
- 10:00 A.M.—10:30 A.M. (Psychiatrist not yet selected)
- 10:30 A.M.—11:00 A.M. Recess to view exhibits
- 11:00 A.M.—11:30 A.M. *Diagnostic Aspects of Surgically Correctable Malformations of the Heart in Infants*, PAUL ADAMS, M.D., University of Minnesota
- 11:30 A.M.—12:00 NOON *Pituitary*, E. H. RYNEARSON, M.D., Mayo Clinic
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Drawing for prize

Radiographic Atlas of Skeletal Development of the Knee, by S. Idell PYLE, Ph.D., and NORMAND L. HOERR, M.D., 1955. Springfield, Illinois: Charles C. Thomas. 82 pages, 29 plates. \$4.25.

This atlas is the second of a series of several radiographic standards of reference for skeletal maturation, based on studies of human growth and development initiated in 1926 by the late T. Wingate Todd, former professor of anatomy of Western Reserve University and director of the Brush Foundation.

In the past, the estimation of skeletal maturation has been based largely on the appearance and fusion of centers of ossification. Between the times of appearance and fusion the surrounding bone undergo consecutive changes in contour as they proceed to full maturity. This thorough investigation shows how to apply consecutive changes in the lower end of the femur, in the upper ends of the tibia and fibula, and in the patella in assessing progress of a child's knee joint toward full maturity by means of a single radiograph.

CHARLES M. NICE, JR., M.D.

Peptic Ulcer; Diagnosis and Treatment, by CLIFFORD J. BARBORAK, M.D., and E. CLINTON TEXTER, JR., M.D., 1955. Boston: Little, Brown and Co., 290 pages, illustrated. \$7.00.

This book is distinguished by its simple clear style of writing. It was read from cover to cover with ease because of its readability and yet is a good scientific treatise. I strongly recommend the book, but doubt that it could be used beneficially by patients as is indicated in the foreword.

JAMES MYHRE, M.D.



The Pathogenesis of Poliomyelitis, by HAROLD K. FABER, M.D., 1955. Springfield, Illinois: Charles C Thomas. 151 pages. \$5.00.

General interest in the pathogenesis of poliomyelitis has probably waned since the acquisition and initial success of the Salk vaccine. This is regrettable, for while the efficiency of this vaccine is yet to be fully tested it has created many problems and questions. The persistence of lessened interest in this disease will certainly slow down further research.

The monograph commences with a discussion of viral properties in general and the epidemiologic aspects of poliomyelitis. These informative chapters are followed by a detailed study of pathologic alterations in neural and extraneural tissues, the latter of little significance except as an indicator of secondary stress and defense organ response. Anatomic aspects conclude the basic studies before the author launches into the controversial features of the portals of entry, the modus operandi of nervous system invasion, the question of viremia, and excretion. The method of intestinal invasion from the nervous system, if true, enhances the value of stool cultures in poliomyelitis as a diagnostic and differentiating weapon. While the axonal spread of virus is an attractive mechanism, many questions are

raised concerning transynaptic spread, the relatively small amount of pathologic alteration in the dorsal horns of the spinal cord as compared to the pathology in the anterior horn region, and the paucity of sensory findings in the poliomyelitis patient.

A wealth of material is presented in a concise authoritative manner and derived from years of experience. The monograph is most welcome, timely, and a reminder that the panacea to this disease is not yet at hand. It is an excellent acquisition to the library of the virologist, neurologist, pediatrician, and to those interested in rehabilitation.

I. A. BROWN, M.D.

The Plasma Proteins in Pregnancy, by HAROLD C. MACK, M.D., 1955. Springfield, Illinois: Charles C Thomas. 118 pages. \$3.75.

The information on this subject in the past has been rather conflicting due, in all likelihood, to some of the chemical limitations on plasma protein determination. The group at Harper Hospital, Detroit, working with the Research Laboratory of the Children's Fund of Michigan, have applied modern electrophoretic techniques and clarified a number of issues. Dr. Mack's unusually well written and easily readable report of these studies not only summarizes the findings, but speculates at length concerning their possible significance. Unfortunately, some of these findings are at present based on a very limited number of observations. For example, only three determinations have been done in normal pregnant women in the first trimester of pregnancy. The data are completely and carefully presented and are well worth the attention of those interested in the alterations of body economy in normal pregnancy.

IRWIN H. KAISER, M.D.

American College Health Association News . . .

We are glad to welcome the following new member whose application has been unanimously approved by the Executive Committee of the association:

Swarthmore College, Swarthmore, Pennsylvania. Representative: Morris A. Bowie, M.D., college physician. Alternate: Susan P. Collis, Ph.D., dean.

L. W. Holden, M.D., director of the Student Health Service at the University of Colorado, Boulder, Colorado, announces that a new building is being planned for the Health Service in the near future.

James Holt, M.D., is the new director of the Health Service at the Municipal University of Wichita in

Wichita, Kansas. Dr. Holt replaces Clinton McDonald.

Mrs. Geraldine Jarry, R.N., has joined the nursing staff at the Health Service at the University of Wichita.

A last minute reminder! The 1956 annual meeting of the American College Health Association is being held May 17, 18, and 19 at the Nicollet Hotel in Minneapolis. We are looking forward to a splendid meeting as Dr. Ruth Boynton, director of the Students' Health Service at the University of Minnesota, local arrangements chairman for the meeting, and her co-chairman, Mr. Edward Dvorak of the staff of the University of Minnesota Health Service, have arranged a most interesting program.

Section on PAIN

Comments concerning this Section, criticisms, or suggestions for papers will be most welcome. Physicians are cordially invited to submit articles pertaining to pain for consideration. All inquiries and manuscripts should be sent to Dr. John S. Lundy, 102 Second Avenue Southwest, Rochester, Minnesota, or to the Editorial Department, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis, Minnesota.

Surgical Treatment of Pain

WALLACE P. RITCHIE, M.D.

St. Paul, Minnesota

PHYSICIANS from the earliest times have felt the burden of pain of their fellow man. No doubt, if it were not for pain, our existence would lose much of its significance. As medical students, we were told that typical coronary pain is substernal and referred to the arm. We were undoubtedly told how the pain sensations reach the conscious centers, but we soon forgot and now administer medications more or less by habit. We treat pain as though the heart were the only organ involved and are not in the habit of treating pain as a disease entity in itself.

The sensation of pain is subjective. Yet Wolff and associates^{1,2} have demonstrated that pain could be measured almost as accurately as the sensations of vision and hearing. They demonstrated that the threshold of pain is fairly constant regardless of race, color, or creed. It is the reaction to pain which differentiates one individual from the other. We frequently fail to take this into consideration and treat the symptoms or the organ rather than the individual. How often we have despaired when caring for the cancer patient with uncontrollable pain. Most individuals accept their discomfort more easily if told the cause of their pain. Others may react differently. The psychologic approach to pain includes not only a true knowledge of the personality of the patient but an air of confidence and optimism on the part of the physician are also important.

For the purpose of this particular discussion,

WALLACE P. RITCHIE is clinical associate professor in neurosurgery at the University of Minnesota and a member of the staff of St. Luke's, Miller, Children's, and Ancker hospitals, St. Paul.

we postulate a patient with inoperable cancer who has intractable pain.

The first line of attack in such a case is drug therapy. This approach attempts to raise the threshold of pain, and, in a patient who has a fairly long outlook for life, the sequence in which drugs are to be used should be carefully planned. It would be foolish to start medication with morphine, the drug of last resort, when aspirin may be sufficient.

Beiter³ recommends the following sequence of drugs: aspirin, acetophenetidin, codeine, Demerol, methadone, and finally morphine and Dilaudid.

The salicylates act centrally, probably on the thalamus. Their anesthetic effect is slight but definite. Wolff and associates^{1,2} have demonstrated that the pain threshold is raised 35 per cent by 25 gr. of aspirin as compared to 70 per cent by $\frac{1}{2}$ gr. of morphine.

Aspirin in combination with Phenacetin, caffeine, and then codeine is the next step in drug therapy. Many other nonalkaloid preparations can be used, but aspirin is still the old stand-by.

When the patient becomes resistant to the minor type of drug therapy, the opium alkaloids are the next choice. In spite of all efforts to improve these drugs, codeine and morphine are still the most effective of this group.

Wolff and associates^{1,2} state that the pain threshold is raised 50 per cent by $\frac{1}{4}$ gr. of morphine, 70 per cent by $\frac{1}{2}$ gr. of morphine, and 90 per cent by 1 gr. of morphine. It is interesting to note that the pain threshold is not increased by any greater dosage of codeine than 1 gr.

Demerol and methadone should be used before resorting to morphine or Dilaudid.

Other forms of medical treatment, such as x-ray therapy, estrogenic therapy, castration, and the use of radioactive isotopes for various types of carcinoma, have their specific place.

In planning an attack on intractable pain, surgical measures are usually withheld until all else has been tried. To withhold a pain relieving operation until the patient is a grave surgical risk or addicted to narcotics is not proper planning. There is a misconception that the cure is worse than the disease. Pain relieving operations are not necessarily drastic procedures. The moderate risk and suffering which attends any surgical procedure may be well worth the risk.

Pain pathways have been well established. Almost all pain fibers, visceral or somatic, enter the posterior roots and synapse with fibers crossing almost immediately in the anterior commissure and then ascend in the anterolateral column as the spinothalamic tract. These fibers carry sensations of pain and temperature but not touch nor some deep pain sensations. As the spinothalamic tract ascends in the cord, the fibers become more compact so that a small incision in the thoracic, cervical, or medullary cord gives a widespread loss of diffuse pain and temperature. Other sensations, such as touch, position, sense, and so forth are not disturbed.

The purpose of surgical relief of pain, with the exception of prefrontal lobotomy, is to interrupt pain sensation with chemicals or by cutting the sensory pathways either peripherally or centrally at various levels. The relief of pain by other means than narcotics, medication, or the surgical removal of an organ can be accomplished by various procedures.

The minor procedures for the interruption of painful sensations are: (1) alcohol injections, and (2) neurotomy.

Alcohol, 95 per cent or absolute alcohol, injected into a nerve destroys the nerve fibers in the same manner as a section of the nerve, and regeneration takes place in peripheral nerves in the same manner as occurs after section.

Alcohol is used commonly in 3 instances:

1. In trigeminal neuralgia.
2. In paravertebral injections either for somatic sensory denervation as in intercostal pain or for sympathetic block for pain of visceral nature. Swetlow⁴ first suggested the use of alcohol for angina pectoris and White perfected the technic. The results from interruption of the cardiac pain fibers which run through the upper three or four thoracic sympathetic ganglia and the corresponding posterior roots have been

satisfactory except for rather frequent intercostal neuralgias occurring after the use of alcohol. Because neuralgias may develop, either a sympathetic ganglionectomy or a posterior rhizotomy is the method of choice in persons who can tolerate the procedure.

Certain difficulties arise in the use of alcohol. In order to be thoroughly effective, it must be injected into or very close to the nerve. For those who have witnessed the size and situation of the sympathetic chain, the difficulty in actually injecting the nerve trunk can readily be realized. Some good results can be obtained, but luck plays a major role. The neuralgias that result in some instances are cause for caution in its use for paravertebral injections.

3. Dogliotti⁵ first reported the use of alcohol injections into the subarachnoid space. The procedure is useful for pain from carcinoma in the pelvis. Rectal and bladder incontinence are frequent residuals, and it is used for the most part in individuals whose condition is extremely poor and who may not live more than a few months.

The other minor procedure for the relief of pain is neurotomy or section of a nerve. This method is seldom used as most nerves are so mixed with motor elements that the resulting paralysis is too disabling. It is used occasionally in trigeminal neuralgia in resecting the peripheral divisions of the nerve. We do not feel this is necessary as alcohol produces the same result, and, when regeneration occurs, the pain reappears.

The major surgical procedures for relief of pain are:

Posterior rhizotomy. This method is the section of the sensory root within the spinal canal. By this route all sensory modalities are severed. This procedure was first performed by Bennett.⁶ It has many disadvantages. If done for a painful extremity, the limb is useless because of loss of all modalities. Moreover, a large laminectomy is needed to cut all the roots to a painful area. Nevertheless, the procedure is satisfactory for pain which is circumscribed in the thorax and for pain in the head and neck. In the latter, a suboccipital craniectomy with section of the descending trigeminal tract with posterior rhizotomy of the upper cervical nerves together with section of the glossopharyngeal and upper vagal fibers gives relief from widespread pain.

Spinothalamic tractotomy. Martin performed the first spinothalamic tractotomy or chordotomy in 1911. For pain below the sixth and seventh thoracic levels, upper thoracic chordotomy at

T2 is the procedure of choice. The incision starts anterior to the dentate ligament and is carried anteriorly and forward at a depth of 4 mm., emerging medial to the anterior root. Usually a bilateral chordotomy is performed even though the pain appears limited to one side. Frequently pain is so intense on one side that a patient fails to recognize pain on the opposite side until the stronger pain has been relieved, at which time the pain on the unoperated side reaches a conscious level and becomes so severe that a second operation is necessary.

Until recently, cervical tractotomies have been considered unnecessarily risky because of the danger of paralysis of the nuclei of the phrenic nerve at the fourth cervical level. However, as time progresses, perfections in technic make it possible to perform high cervical tractotomies which give satisfactory relief of pain in the high thoracic and arm areas.

The first high cervical tractotomy was performed by Stookey⁷ in 1934. Schwartz has been able to obtain a level of analgesia as high as the fourth cervical level with chordotomy at the second cervical level and limited to the dorsal one-half of the anterolateral column. Schwartz and O'Leary⁸ reported the first case of medullary tractotomy in 1941. This procedure also gives a high level of analgesia. Mesencephalic or midbrain tractotomy, first reported by Dogliotti in 1938 and Walker in 1941, is theoretically an ideal location for tractotomy. It not only severs the descending spinothalamic tract but also secondary trigeminal fibers, so that the whole contralateral part of the body including the face becomes analgesic. The mortality rate is higher with this operation than with others and, thus, it is not as useful as our other approaches.

Sympathectomy. This operation relieves pain arising in the heart, aorta, and abdominal viscera, but not in the bladder, prostate, nor uterus, where a majority of the afferent fibers run in the vagi or sacral nerves. Splanchnic denervation may relieve liver, gallbladder, or duct disease and pancreatic pain. The operation of presacral

neurectomy is well established for the treatment of dysmenorrhea.

Sympathectomy in the treatment of true causalgia has been more effective than all other types of treatment, although the pain is not relieved in all instances.

Prefrontal lobotomy. This is an accepted procedure for the relief of pain and procures satisfactory results. Its use, however, must be limited to those patients in whom all else has failed and life has become unbearable. It is useful when the pain has become fixed and in cases of generalized carcinoma. Personality changes must be expected.

To leave the discussion of surgical therapy with the impression that there are no risks nor disturbing side effects would be erroneous.

The operative risk is minimal. A small incision and a small laminectomy carry a low mortality.

The postoperative course is complicated by back pain and frequently posterior root pain due to traction. These pains disappear within two weeks.

The disturbing side effects are caused by occasional loss of bladder and bowel control and weakness to actual paralysis of the legs. However, if performed in the otherwise incurable patient, the side effects are acceptable if the pain has been relieved. In spite of these occasional complications, spinothalamic tractotomy—thoracic, high cervical, or medullary—is our best surgical line of attack in otherwise incurable pain of cancer.

SUMMARY

Surgical methods for relief of pain have been stressed in this discussion. Surgery, however, is only one method of treatment. If the physician has a plan of action at the outset of his care of the patient with pain, particularly from cancer, and uses each method at the proper time and to the proper extent, the patient's life will be happier and the physician will be relieved of a great burden.

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Editorial

COMMENTS ON THE SECTION ON PAIN

ALTHOUGH several papers on the control of pain have appeared in this Section on Pain, it is well to have the subject treated in an inclusive manner. A paper, "The Surgical Treatment of Pain," by Dr. Wallace P. Ritchie, again calls attention to the importance of having a fixed plan for care of the patient with terminal carcinoma. The question of drug therapy can be of great moment if, for the relief of chronic pain, the physician prescribes a drug such as meperidine hydrochloride (Demerol hydrochloride), because the symptoms of withdrawal of this drug appear early. Addiction to the use of Demerol develops early, and then the physician is faced with the difficulty of not only treating the patient for the pain of carcinoma but also for the distress of the withdrawal symptoms of the drug used to overcome his pain. So far as addiction is concerned, one of the differences in treating a patient who has real pain and one who does not is that the patient with pain usually is less apt to become addicted to the drug than is the one who does not have pain. Hence, it may come about that after a patient apparently addicted to use of a drug undergoes operations or injections for destruction of pain pathways, he may not require the medication after the pain has been eradicated.

All this requires careful consideration, and fortunately we have drugs at hand which potentiate the action of other drugs. A good ex-

ample is Phenergan hydrochloride, which potentiates most other drugs of an analgesic or narcotic nature. Hence, even when the patient is not being treated for pain directly, the combination of Phenergan and a drug such as Placidyl gives satisfactory results from the standpoint of producing sleep. Phenergan also tends to control nausea.

For patients who have thalamic pain, and particularly after a stroke, the analgesic drugs are of little avail, but drugs which induce sleep have more promise of giving escape from pain than can be expected from other drugs. For instance, a patient suffering from thalamic pain may obtain considerable rest from a 25 mg. dose of Phenergan hydrochloride and 500 mg. dose of Placidyl by mouth during the day. Much relief also can be obtained at night by taking the same dose at bedtime and repeating it four or five hours later, if necessary. It is consoling to think that there is some possibility of providing a patient with some degree of escape from thalamic pain when it seems as if nothing short of general anesthesia could do so.

Departure from recent custom by moving the Section on Pain from the April to the May issue for 1956 is done for what I consider a very good reason. That is, it is not proposed to publish the Section on Pain regularly unless the material available for it is judged to be worth while. *Furor scribendi* certainly is a common affliction, but it is not the policy of this Section or of THE JOURNAL-LANCET to publish papers simply for the purpose of assembling a medical journal.

JOHN S. LUNDY, M.D.

Book Reviews on Pain

COMPLICATIONS OF REGIONAL ANESTHESIA: ETIOLOGY, SIGNS AND SYMPTOMS, TREATMENT, by DANIEL C. MOORE, M.D., director, Department of Anesthesiology, Mason Clinic; chief of anesthesia, Virginia Mason Hospital, Seattle, Washington, 1955. Springfield, Illinois: Charles C Thomas, 291 pages. Price \$10.50.

It takes courage for an author to publish a book on complications of any kind of anesthesia, but regional anesthesia is the most dangerous with which to deal, since patients are conscious and lawyers may be eager to substantiate a patient's claim that he has been mistreated if a complication develops. Nevertheless, the author has treated the subject adequately.

The book is printed on good paper, easily read, and well indexed. A unique feature is an appendix in which the complications are listed under the named nerve. This is an unusual feature and a good one.

The complications discussed are commonly seen, such

as the systemic reactions to local anesthetic agents and the various things that cause concern in the use of spinal anesthesia. Bleeding after puncture of blood vessels, dermatitis, nausea and vomiting, headache, meningitis and meningeal irritation, broken needles, retention of urine, hiccup, and paralytic ileus are also discussed.

This book certainly will serve a useful purpose and can be recommended to anyone interested in local or regional anesthesia.

JOHN S. LUNDY, M.D.

BODY FLUIDS IN SURGERY, by A. W. WILKINSON, Ch.M., F.R.C.S.E., senior lecturer in surgery, University of Aberdeen; assistant surgeon, Aberdeen Royal Infirmary and Royal Aberdeen Hospital for Sick Children, 1955. Edinburgh: E. & S. Livingstone, Ltd., 212 pages. Price 16s.

The questions of body fluids in surgery are extremely important, and in this small book the author effectively

discusses the whole subject. He even points out the relationship between body fat and water and the distribution of the water. He discusses at length the question of sodium with potassium and cellular membrane permeability and fluid exchanges and, of course, water balance. He not only makes clear which values and conditions are normal with respect to sodium and potassium but also goes into the abnormal situation and values there. There is a chapter on acid-base balance, how injury affects metabolism and the chemical changes of the blood that occur after injury, as well as a chapter on disturbances caused by loss of gastrointestinal secretions and one on the influence of associated disease on fluid and electrolyte balance.

A chapter on the general principles of treatment is included, together with a table showing the solutions used for intravenous feeding. There also is a table showing the composition of solutions used for electrolyte replacement. An appendix contains tables for the normal range of concentrations of blood constituents, atomic weights, valencies, and equivalent weights and the milliequivalents per gram of the various substances discussed.

The book is published on good paper, contains a really good list of references, and is nicely indexed. This book should be read by everyone concerned with a patient who must undergo an operation.

JOHN S. LUNDY, M.D.

POSTURAL BACK PAIN, by MILTON C. COBEY, M.D., professor of surgery, Georgetown University Medical School, Washington, D.C., 1956. Springfield, Illinois: Charles C Thomas, 78 pages. Price \$3.00.

The question of back pain has been with us indefinitely. To many the problem is still poorly understood. Hence, as might be expected, the treatment at times has been bizarre and ineffective. Dr. Cobey discusses the problem of pain in the back from the standpoint of posture, and he has chosen the illustrations in such a way that they augment the text and clarify many of the problems that have seemed very complicated.

Of special interest is the chapter on the development of posture in human beings. Obviously, this is the beginning point for an understanding of the later chapters. One chapter points out the technic of examination, from which a diagnosis can be made. A chapter on postural disease syndromes indicates the importance of considering posture when dealing with various syndromes, such as the scalenus anticus syndrome, arthritic changes in the cervical part of the spinal column, and congenital abnormalities of the neck and epiphysitis.

Reference is made to army statistics on pain in the lower part of the back, where the question of posture becomes very important. The author also deals with diseases of the lower part of the back that are not purely postural. Included among them are protruded intervertebral disk, diseases of the hip joint, and luxation and subluxation of vertebrae. Care of what the author calls "the postural back" is sufficiently described and illustrated to enable the physician to be of real help to a patient who needs such care. Instructions as to prophylactic measures to ensure good posture are set forth, such as how to sit at a desk, how to walk, how to lift, calisthenics, and how to rest and sleep.

A brief summary concludes the text, which is followed by a glossary that adds value to the work. The book also includes a bibliography of 95 references and a bibliographic index as well as a subject index. It should be read not only by all physicians but by all those who deal with people's bodies.

JOHN S. LUNDY, M.D.

CLINICAL ANALGETICS, by E. G. GROSS, M.D., professor and head, Department of Pharmacology, State University of Iowa, College of Medicine, Iowa City, Iowa; and M. J. SCHIFFRIN, Ph.D., assistant director of clinical research, Hoffmann-La Roche, Inc., Nutley, New Jersey, 1955. Springfield, Illinois: Charles C Thomas, 101 pages. Price \$3.00.

This monograph is concerned essentially with analgetics, or the study and use of analgetic agents for the general practitioner, dentist, pharmacist, and medical student. General anesthetic agents are not discussed, but local anesthetic agents are. Not every agent used in the treatment of pain is included, because the list would be excessively long if it were. Furthermore, many anesthetic agents, which are possible to use, actually would be used only rarely. A new word "opioid" is used in lieu of "synthetic opiate-like compounds."

The first chapter deals with general considerations; the second chapter deals with salicylates, paraminophenols, and pyrazolones. The next two chapters are concerned with the opiates. These are followed by a chapter on the opioids and another on opioid antagonists. The final chapter is on local anesthetic agents.

The book is indexed and the material is presented in the briefest form possible, so that the reader may refer to any drug in question and obtain the essential information that is needed very quickly. This is an excellent and handy reference book.

JOHN S. LUNDY, M.D.

Current Literature on Pain

ANÆSTHESIA AND THE COMMON COLD, by GEORGE ELLIS. *Anæsthesia* 10:78-79, 1955.

"Opinion has been fairly unanimous in the past that the presence of an upper respiratory infection before operation is a good reason to postpone surgery. Inquiry has, however, never succeeded in revealing the facts upon which this opinion was based. A diligent search of the literature has unearthed the same opinions and the same lack of facts . . . As a first principle, I feel that few will disagree with the dictum that, if the patient needs his operation now, then he is fit for the anæsthetic now.

Whatever the other conditions may be from which he is suffering, some form of anæsthesia can be found which will minimize the risks. When the patient needs an operation soon, the real problem arises and he may need it soon for a variety of reasons other than the actual condition for which surgery is contemplated; for example, it may have taken the doctor a great deal of time and trouble to persuade the patient to enter the hospital and to send him home because of a common cold may jeopardize the whole undertaking; or, postponement of the operation until the cold has gone can sometimes produce

such profound depression in the patient that he becomes as poor a risk as he was when he had the cold and, also, prolongation of the illness can be economically undesirable. Often, therefore, it may be worthwhile to run the risk of prolonging the illness postoperatively rather than to insist on the certainty of doing so preoperatively. I would state as my second principle that only in those cases in which we are absolutely certain that postponement will cause no one to suffer should the operation be put off till the cold has gone. I am encouraged in this view by the belief that the virus itself will not extend beyond the upper air passages and that, with the united aid of the pathologists, a carefully chosen antibiotic, and the physiotherapists, we can make the risk of an extension of the secondary infection so small as to be negligible. There will, of course, be some exceptions to this principle."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Co., 1955, Vol. 41. Copyright by J. S. LUNDY.

THE RECOVERY ROOM IN THE CARE OF THE SURGICAL PATIENT, by V. J. COLLINS. New York State J. Med. 55:782-790, 1955.

"Two types of recovery units may be recognized in hospital and surgical theaters. The postoperative recovery unit or ward is the unit which provides for the management of patients after operation to the time when they are no longer requiring any extraordinary measures in the way of medical or nursing care for their immediate continued existence. . . . On the other hand, the unit with which we are concerned is one in which the patient is observed and treated in the early hours following surgery. . . . Inherent in the definition and requirements are to be found the advantages of the Unit. These are threefold: the prevention of morbidity, economy of time and personnel, and economy of equipment. . . . The entire field of general medical care, especially its emergency aspects, is to be encountered in this adjunct to good surgical management."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Co., 1955, Vol. 41. Copyright by J. S. LUNDY.

THE EFFECT OF NEEDLE SIZE ON THE INCIDENCE OF POSTDELIVERY SPINAL HEADACHE, by H. D. BUMGARDNER and F. D. BURNS. Am. J. Obst. & Gynec. 69:135-139, 1955.

"The number of headaches due to spinal anesthesia as well as other minor and some more serious complications have led many physicians to abandon its use completely, despite the fact that it frequently offers definite advantages over other methods for pain relief. . . . Many drugs have been used to relieve or reduce the severity of the headache, but as yet none has given consistently satisfactory results. Therefore, it appears more practicable to attempt to acquire a better understanding of its cause and to direct our efforts toward preventing its occurrence. . . . A total of 918 women to whom spinal anesthesia was administered for delivery in the Temple University Hospital [Philadelphia] are included in this study. . . . In 690 cases the anesthetic agent was administered through 26 gauge needles and in 228 through 20 and 22 gauge needles. The technique for the administration of saddle block anesthesia varies little from that already reported. Since the results and the complications associated with the use of the 20 and 22 gauge needles were comparable, they will be considered together. In 206, or 90 per cent of the patients, anes-

thesia adequate for delivery was obtained from the original blocks. The remaining 22 requires some sort of supplemental anesthesia. A total of 56, or 24.1 per cent, of the patients complained of headache during the postpartum period, of which 39, or 17.1 per cent, were thought to be typical of those following spinal anesthesia. Of those, 20 or 51 per cent, were severe and the remainder mild to moderate. Headache was noted in 29 per cent of the private patients as compared to 17 per cent of the ward. In 228 cases there were 3 failures, or 1.3 per cent. Of 628 patients in whom spinal anesthesia was attempted with the 26 gauge needle, in 30 the subarachnoid space was accidentally entered with a 20 gauge introducer, or there was failure to puncture the dura with the smaller needle. In 579 cases, or 92 per cent, the spinal anesthesia was adequate for delivery. Supplemental inhalation anesthesia was required in 49 cases. Of the 628 patients, 48 had headaches, or a total of 6.8 per cent. Only 24 of the 48, or 3.4 per cent, were considered as being typical and of these only 7, or 29 per cent, were severe. Headache occurred in 8.3 per cent of the private patients and 5.4 per cent of ward cases. . . . This study has shown that the number of headaches after spinal anesthesia administered with a 26 gauge needle was 69 per cent less than if the dural puncture was made with one of a standard size."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Co., 1955, Vol. 41. Copyright by J. S. LUNDY.

CLINICAL OBSERVATIONS ON THE USE OF ALPHAPRODINE (NISENTIL) FOR POSTOPERATIVE ANALGESIA, by E. H. BACHRACH, A. N. GODHOLM, and A. M. BETCHER. Surgery 37:440-445, 1955.

"The purpose of this paper is to review the effectiveness, safety, and clinical suitability of Nisentil as an analgesic agent in the treatment of pain associated with postoperative surgical conditions. . . . The effects of Nisentil were compared in this study with those of meperidine as a postoperative analgesic. Complications and side effects were also observed. There was no specific selection of patients for this study other than they were all adults who were scheduled to undergo a surgical procedure. . . . There were 478 patients studied in this series. One half of them received Nisentil and one half received meperidine. The dosage of the drug was determined on the basis of Nisentil being approximately twice as potent as meperidine. . . . Dosages of Nisentil varied from 30 to 60 mg. given every two hours as required. Meperidine in 50 to 100 mg. doses was given every four hours as required. The average number of doses of Nisentil per patient was 5.1 as compared with 3.9 for meperidine. The onset of pain relief with Nisentil occurred in 11.9 minutes; with meperidine in 19.4 minutes. Analgesia was obtained for an average of two hours and fifty minutes with Nisentil and four hours and seven minutes with meperidine. Nausea and emesis occurred slightly less frequently with Nisentil and were more severe with meperidine. Diaphoresis was observed more often with Nisentil and was more profuse than with meperidine. . . . Nisentil is well tolerated by most patients and its rapid onset of pain relieving action is appreciated by all patients. Its lack of euphoric effect and mental dullness makes for an improvement over previously used analgesic agents, particularly with respect to addiction."

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News Briefs . . .

North Dakota

DR. FRITZ LIPMANN, Nobel Prize Laureate in medicine and physiology and professor of biochemistry at the University of Harvard, will be the guest lecturer at the dedication of the Ireland Research Laboratory, Biochemistry Department, University of North Dakota Medical School, on May 7. His subject is "The Biochemistry of Energy Transfer."

DR. GEORGE D. EDWARDS, for the past year a resident in general practice at the County Hospital, Monroe, Louisiana, has established practice in Riverdale. The community has been without a full-time physician since last fall.

DR. J. R. McDOUGALL, who has been associated with Drs. D. J. Halliday and R. T. Gammell in Kenmare since October 1955, is now practicing in Minot. Dr. McDougall took over the practice of Dr. Martin P. Conroy, who recently left for Spokane, Washington.

Minnesota

A NEW FIELD HEALTH CLINIC was opened recently at Redlake. The center includes an office for field health, under direction of Dr. Lee Dimery; an outpatient clinic for treatment of ambulatory patients; and a dental office. The new structure is located directly across from the Redlake Hospital.

DR. E. A. MEYERDING, executive secretary of the Minnesota Tuberculosis and Health Association, recently received the William C. Anderson Service Award for his contributions to the field of health education and health

services for Minnesota school children. The award was presented in Chicago at a meeting of the American Association for Health, Physical Education and Recreation.

DR. MALCOLM M. HARGRAVES, consultant in medicine at the Mayo Clinic and associate professor in the Mayo Foundation, is winner of an alumni achievement award from Ohio State University College of Medicine. The award, which is given for outstanding professional attainment, honored Dr. Hargrave's research in blood.

DR. WALTER A. FANSLER, clinical professor of surgery at the University of Minnesota, addressed the sixth annual Middle East Medical Assembly in Beirut, Lebanon, on April 9. Dr. Fansler's subject was "Cancer of the Colon."

DR. ANCEL KEYS, head of the department of physiological hygiene at the University of Minnesota, accompanied Dr. Paul Dudley White to Japan and Hawaii in March for a research study on the differences in heart and blood pressure between native Japanese and Japanese in Hawaii.

DR. L. H. FLANCHER has been appointed superintendent and medical director of Sunnyrest Sanatorium at Crookston, replacing Dr. Baldwin Borreson who recently resigned because of ill health.

DR. J. DEXTER LYON, physician and surgeon formerly of MacGregor, Iowa, has begun practice in partnership with Dr. H. E. Drill in Hopkins. Dr. Lyon's arrival coincided with plans for construction of a new clinic in Hopkins.

DR. PAUL S. FRASER has joined the staff of the Mork Clinic in Anoka. A 1954 graduate of Creighton University, Omaha, Nebraska, Dr. Fraser did postgraduate work in internal medicine and surgery at Pontiac, Michigan and at St. Mary's Hospital, Minneapolis.

(Continued on page 32A)

Respiratory and Circulatory Stimulation, Analeptic Action

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Original Research in Medicine and Chemistry

NEWS BRIEFS

(Continued from page 30A)

DR. T. W. MILROY, an obstetrician and gynecologist at the Lenont-Peterson Clinic in Virginia, recently opened an office in Aurora in association with Dr. I. T. Dahlin.

DR. JOHN W. ANDERSON, who recently completed a post-graduate course in anesthesia in Chicago, has joined Drs. George W. Drexler and D. V. Smith at the Blue Earth Medical Center. Dr. Anderson previously practiced for five years in Sidney, Montana.

DR. FREDERICK P. MOERSCH, special consultant in neurology at the Mayo Clinic, has retired after thirty-six years of active service. An outstanding authority on the diagnosis and treatment of neurologic disturbances, Dr. Moersch has written 78 papers on neurology and psychiatry and is the author of *Neurology and Psychiatry for Nurses*.

South Dakota

DR. C. RODNEY STOLTZ recently joined the department of obstetrics and gynecology at the Bartron Hospital Clinic in Watertown. The Bartron Hospital has been purchased by Methodist Homes, Inc., and will be converted into a home for elderly people. The clinic will function as usual until completion of a new clinic building for which plans are now underway.

OPEN HOUSE for a combination office and home to be used by Dr. Andrew B. Hesz was held recently in Rapid City. The event commemorated completion of the building by Hultz Memorial Clinic, Inc. Originated in 1951 by the Hill City Rotary Club, the corporation was formed in honor of a late pioneer Hill City physician. A full basement houses laboratory and x-ray equipment.

Deaths . . .

DR. A. W. GUEST, 86, former superintendent of the North Dakota State Hospital at Jamestown, died late in February. Dr. Guest began his practice in Erie, North Dakota, in 1898 and moved to Jamestown five years later.

DR. CLARENCE E. LOMMEN, 72, a physician in Fordville, North Dakota for more than forty years, died February 20.

DR. HENRY H. LEAVITT, 94, a Minneapolis physician for fifty-eight years, died March 18. Dr. Leavitt began practice as a general practitioner, later becoming a specialist in diseases of the eye, ear, nose, and throat.

DR. BERT LEVIN, 56, St. Paul eye, ear, nose, and throat specialist, died February 8 of a heart ailment. A member of the Earl Clinic for twenty-eight years, Dr. Levin was also on the staffs of Midway and Mounds Park hospitals, St. Paul, and a member of the American Academy of Otolaryngology.

DR. GEORGE SENKLER, 86, St. Paul physician for over fifty years, died February 4. Dr. Senkler was associated with St. Luke's Hospital, St. Paul, for many years.

DR. GUSTAF A. HEDBERG, 49, director of the Nopeming Sanatorium, Nopeming, Minnesota, died March 27. A well-known authority on treatment and control of tuberculosis, Dr. Hedberg was awarded the 1955 Dearholt Medal for outstanding service in tuberculosis control.

(Continued on page 34A)

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NEWS BRIEFS

(Continued from page 32A)

DR. JOHN E. SOPER, a leader in veterans work, died March 24. Dr. Soper practiced for twenty-one years in Norwood and Delano, Minnesota, served as a surgeon in World War I, and was assigned with the federal public health service and Minneapolis veterans hospital.

DR. C. E. LOWE, 63, a Mobridge, South Dakota physician for nearly thirty-six years, died February 2 of a heart attack. After serving eight years on the Mobridge Hospital staff, Dr. Lowe opened his own private hospital in 1928. A year later he launched construction of the present Lowe Hospital which was opened in 1930.

DR. IRVIN L. SCHUCHARDT, 49, of Aberdeen, South Dakota, died February 6. Dr. Schuchardt practiced in Aberdeen since 1937, with the exception of two and one-half years as captain in the medical corps during World War II.

DR. HARRY T. KENNEY, 73, a South Dakota physician for over fifty years, died January 28 in Watertown. Dr. Kenney was honored in 1954 by the South Dakota State Medical Association to commemorate his fifty years of service as a general practitioner.

DR. JAMES L. STEWART, 90, retired staff physician of Homestake Hospital, Lead, South Dakota, died January 30. Dr. Stewart retired from the Homestake staff in 1940 after nearly twenty years of service.

DR. GEORGE H. GULBRANDSEN, 72, pioneer South Dakota physician and surgeon, died March 21. Dr. Gulbrandsen began practice in Canton, South Dakota in 1907 and moved to Brookings in 1918, where he resided until his death.

Advertisers' Announcements

DOXINATE DOSAGE NOW MORE FLEXIBLE

A new 60 mg. green, soft, gelatin capsule has been added to the dosage forms of Doxinate, made by Lloyd Brothers, Inc., Cincinnati. Usual adult dosage is 1 capsule daily. Together with the 20 mg. orange capsules, the new form makes adjustment of individual adult dosage simpler and more flexible. Lloyd Brothers, first on the market with the new fecal softener, will also continue to supply Doxinate in 60 cc. bottles for infants and small children and for those who prefer to take medication in fruit juice or other liquid.

THORAZINE A RESTORATIVE

"Gratifying and dramatic relief" of agonizing pain which led to "four suicide attempts" by a patient with a thalamic pain syndrome was obtained with the use of chlorpromazine.

Drs. Lester H. Margolis and Alfred J. Gianascol report this case in the April issue of *Neurology* in an article entitled "Chlorpromazine in Thalamic Pain Syndrome." This syndrome, characterized by a massive wall of distressing pain in all or part of the involved half of the body, caused by damage to the perceptive centers in the thalamic region of the midbrain, is called by the authors "one of the most distressing disorders encountered in medical practice." Chlorpromazine, better known in the United States by the trade name "Thorazine" (Smith, Kline & French Laboratories, Philadelphia), is widely used in the treatment of the mentally ill.

The clinicians describe a 41-year-old housewife who developed paralysis of the right side of her body, loss

in the management of peripheral vascular disorders

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of speech, blindness in half of her visual fields, and loss of sensation on one side. "These functions gradually returned, but recovery was marred by the development of distressing, burning pain throughout the involved side."

Noting that "no satisfactory treatment for the thalamic pain syndrome exists," and that "analgesic drugs may fail and surgical procedures, such as lobotomy offer the only hope for relief," the doctors state that after six days of chlorpromazine treatment, the patient was "able to engage in physiotherapy and other activities previously denied her by pain."

A reasonable conclusion, the report continues, would be that the benefit derived from chlorpromazine was twofold, in that the drug acted to reduce both the emotional response to pain and the thalamic activity and/or irritation responsible for it. The doctors emphasize that this patient has been maintained in a comfortable state for a year-and-a-half on a daily dose of 200 to 400 mg. of chlorpromazine.

PEDIATRIC ABBO-LITER CONTAINERS

Abbott now has 8 intravenous solutions available in a new 150 cc. Abbo-Liter container for pediatric use. The new Abbo-Liter is molded with 10 cc. graduations for rapid determination of quantity administered. Space has been provided on the label for the patient's name and directions by the prescribing physician. The following solutions are now available from Abbott Laboratories, North Chicago, Illinois, in 150 cc. Abbo-Liters, in addition to the regular 250 cc. and 500 cc. sizes: dextrose 2½ per cent in water; dextrose 5 per cent in water; Ionosol PSL; isotonic sodium chloride; sodium lactate 1/6 Molar; dextrose 2½ per cent in ½ strength lactated Ringer's; dextrose 2½ per cent in ½ strength Ringer's solution; and dextrose 2½ per cent in ½ strength saline.

(Continued on page 41A)

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Packages: 2 cc. vial (1 immunization),
10 cc. vial (5 immunizations).

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In musculoskeletal disorders

"more nearly approaches the ideal striate-muscle-relaxant drug than any previously studied"¹

In neurologic disorders

"14 of 18 patients with spasticity due to spinal cord lesions showed objective improvement of spasticity"²

1. Smith, R. T.; Kran, K. M.; Peak, W. P., and Hermann, I. F.: J.A.M.A. 160:745 (Mar. 3) 1956.

2. Rodriguez-Gomez, M.; Valdes-Rodriguez, A., and Drew, A. L.: J.A.M.A. 160:752 (Mar. 3) 1956.

*T.M.

†U.S. PATENT PENDING

‡**Lissive**: Relief of skeletal muscle spasm without interference with normal function.

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COMING in *July*...

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- Problems to avoid in the field of abdominal surgery are discussed in the article "Pitfalls of Surgery" by Edward R. Woodward, M.D., of the department of surgery at the University of California Medical Center, Los Angeles. The reader is warned of hazards that may arise from the injudicious use of antibiotics, the overuse of blood transfusions, and undue dependence upon laboratory aids.

- "Present Status of Cardiac Rehabilitation" by Leonard J. Goldwater, M.D., professor of occupational medicine at Columbia University School of Public Health, presents an account of various cardiac rehabilitation programs in effect today. These include work classification units, sheltered workshops, and methods of work simplification in the home and on the farm. Workmen's compensation as it relates to heart disease has created a problem. The future success of cardiac rehabilitation programs depends largely on finding a solution to this problem that is scientifically based, economically sound, socially acceptable, and legally fair.

- Diagnosis of acute gouty arthritis is based chiefly upon signs of inflammation in the peripheral joint or joints. Ancillary diagnostic measures include a positive family history, the presence of albuminuria, mild hypertension, and urinary tract calculi. These are some of the features discussed in "Diagnosis and Treatment of Gout" by John H. Talbott, M.D., of Buffalo, New York. The prophylactic value of Colchicine is stressed and Benemid is recommended as a uricosuric agent which aids in eliminating uric acid from the body. A diet low in purines and fats is advised, and the importance of a high fluid intake is emphasized.

- The tranquilizing effects of chlorpromazine and reserpine are unique. As a result, these drugs have become the most useful of any available today for the management of acute states of excitement. "The Current Status of Chlorpromazine and Reserpine in Psychiatric Practice" by Burtrum C. Schiele, M.D., Richard W. Anderson, M.D., and Werner Simon, M.D., of the division of psychiatry at the University of Minnesota Medical School, presents a digest of recent reports and conferences as well as the author's clinical experience with these drugs

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA POSTGRADUATE COURSES

A course in Dermatology for General Physicians will be presented June 4 to 6.

TUBERCULOSIS SYMPOSIA

The annual symposium for General Practitioners on Tuberculosis and other Chronic Pulmonary Diseases will be held at Saranac Lake, New York, July 9 to 13. Many of the sessions will be informal discussions with ample opportunity for questions. Registration fee is \$40. Further information can be obtained from Dr. Edward N. Packard, General Chairman, P.O. Box 262, Saranac Lake, New York.

INTERNATIONAL CONGRESS ON DISEASES OF THE CHEST

The fourth International Congress on Diseases of the Chest of the American College of Chest Physicians will be held in Cologne, Germany, August 19 to 23. Special emphasis will be placed on surgery of coronary diseases. For further information, write the secretariat: Fourth International Congress of the American College of Chest Physicians, Köln-Duetz, Germany, Messeplatz.

BLOOD BANK ASSOCIATION

The annual meeting of the American Association of Blood Banks previously scheduled to meet in Cincinnati, November 4 to 7 has been changed. The meeting will take place September 3 through 5 at the Somerset Hotel, Boston. Direct inquiries to Miss Marjorie Saunders, Secretary, 725 Doctors Building, 3707 Gaston Avenue, Dallas, Texas.

PUBLIC HEALTH MEETING

The annual meeting of the American Public Health Association and 40 related organizations will be held in Convention Hall, Atlantic City, November 12 to 16. Explorations into the question "Where Are We Going in Public Health?" which were undertaken at the last meeting will be continued. The 13 sections of the association have been augmented this year by a new section on Mental Health.

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1. Moyer, J. H., in discussion of Galen, W. P., and Duke, J. E.: Outpatient Treatment of Hypertension with Hexamethonium and Hydralazine, *South. M. J.* 47:858 (Sept.) 1954.

2. Finnerty, F. A., Jr.: The Value of Rauwolfia Serpentina in the Hypertensive Patient, *Am. J. Med.* 17:629 (Nov.) 1954.

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Anxiety-Tension States in Poliomyelitis

GEORGE J. BOINES, M.D.

Wilmington, Delaware

MEDICINE has made progress in some instances, and in other instances it has failed. One of these failures is our lack of understanding and our inability to deal successfully with the instabilities of the nervous system which lead to afflictions as serious as those we know to be dependent on tangible physical causes. Instabilities resulting from fear, anxiety, tension states, and various emotions, although they cannot be measured, certainly play an important role in poliomyelitis.

Few diseases create more panic and fears than those observed in poliomyelitis. Threats and conflicts are omnipresent and constitute a large section of the stress to which individuals are exposed. Fear begets fear and, like a smouldering ember, needs only a light breeze to fan it into a roaring flame. The fear of poliomyelitis is drilled into the general population, with children singled out, either intentionally or otherwise, as special targets. Emphasis on the crippling effects of the disease during yearly campaigns for funds certainly increases the fear complex of the public. The showing of respirators, crutches, and wheel chairs on posters, television, and in the movies gives the impression that all patients contracting poliomyelitis become cripples. The emotional reaction is further increased

by the sight of a few poliomyelitis victims in school or around the neighborhood.

The population as a whole, as a result of the propaganda, has been made emotionally susceptible to the disease. One can only conjecture how a child feels when the possibility of poliomyelitis appears. The thought of pain and loss of freedom of play as depicted on posters contribute to the fear. A psychoneurotic state might develop in the adult male if he continually pictures himself as a poliomyelitis cripple unable to provide for his family. And we are well aware that the feminine mind invariably translates impressions into personal feelings. Thus, all segments of the population are rendered emotionally susceptible to the disease.

The rousing of mass hysteria can be justified only as a fund-raising expedient. Statistically, poliomyelitis has a high recovery incidence and a low mortality. The over-all functional disability, which may result, is less extensive than that seen in many other diseases, for example, rheumatoid disease. Although occasionally the prognosis is not favorable, it is wrong to deny these patients the hope they so optimistically expect from the physician. The medical profession is ethically bound, therefore, to present the true facts about poliomyelitis at every opportunity and to sponsor a systematic educational program; to point out that any calamity, whether of known or unknown origin, is essentially motivated by fear.

GEORGE J. BOINES is attending chief of communicable diseases and poliomyelitis, Wilmington General and St. Francis hospitals, Wilmington, Delaware and lecturer, department of biological sciences, University of Delaware.

Read before the ninth annual fall Postgraduate Clinic, November 9, 1955, Detroit, Michigan.

An explanation of the meaning of nervousness, anxiety, fear, and anxiety-tension states will provide clearer understanding of these phenomena in poliomyelitis.

"Nervousness," according to Cobb,¹ "is a rather diffuse affair, a mild 'readiness reaction'; this state in an exaggerated form then becomes an anxiety attack."

Weiss and English² define anxiety as "an unpleasant feeling tone associated with conscious or unconscious ideational content of a frightening nature."

After a study of underlying physiologic processes in any state of anxiety, Dixon and associates³ concluded that "anxiety is the emotional expression of a physiologic state in which the body, as a whole, is preparing to combat any known threat to its integrity . . . this particular state of preparation is manifested by more than just anxiety, but includes evidence of preparation in the entire neuromuscular set-up to bring about what is commonly called 'anxiety tension state'."

The poliomyelitis patient, just as any patient, calls on a physician to cure him, not to undertake endless diagnostic procedures. Many influences of mind and body are active and frequently the patient reacts with emotions that may influence his desire to cooperate with the physician.

Successful management of the poliomyelitis patient is not restricted to knowing which laboratory tests to order for confirmation of the clinical diagnosis or which drugs should be prescribed. These procedures are necessary and significant, but to study and know the patient are of greater importance. To know the patient is to gain his confidence and to help him resolve emotional conflicts that might interfere with successful treatment. At the outset the patient seeks assurance that the selection of his physician is justified. After this assurance is realized, he is willing and anxious to believe whatever he is told and believe it not only rationally but, what is more important, emotionally. At this stage, the battle is either won or lost.

Physician-patient relationship cannot be too strongly emphasized. The way in which the physician approaches the patient on his first visit may influence the prognosis. No doubt many problems will arise to tax the physician. However, every effort must be made to displace despair and discouragement with hope and confidence.

Gehring⁴ is worth quoting: "When we enter the presence of the sick, we must bring with us first of all, another presence — the presence of the well. We must have ever a thought to the

vital importance of displacing despair and discouragement with hope and confidence. The embers of fear are always smouldering. We must have in our constant possession, at our instantaneous service, the instant perception of the need that such smouldering fire needs quick extinction long before we feel the sick man's pulse."

The great problem with the poliomyelitis patient and his immediate family, according to Boines,⁵ is the anxiety and tension resulting from fear. Fear is also responsible for muscle tension. At this point, it may be well to establish that tension is not a mental nor a personality disturbance. Garmany⁶ states that "patients must understand that the anxious state is an alerting process and that physical exercise is useful in altering the alerted state to one where neuromuscular energies have been released and physical relaxation is more apt to take place."

To allay anxiety in the patient and members of his family we like to quote Father Keller's words⁷: "Anxiety never baked a cake, built a bridge, won a battle, or solved a problem. Important as we are, we really render ourselves less useful, and less important, if we let worry stall our actions."

According to Jacobson⁸ "An emotional state fails to exist in the presence of complete relaxation of the peripheral parts involved." We have stated⁵ that "if a state of relaxation and tranquility can be produced in the patient and in members of the family, they are effectively relieved of their tension state. This leaves more time and energy for attention to purely physical details — early ambulation, muscle relaxation by curarization, an active exercise program, extended medical supervision and good nutrition."

At this point, we would like to interpolate a few words about the importance and significance of the capillary system in poliomyelitis or any other disease state. The normal function of the brain and spinal cord is dependent upon an intact capillary system. Any disturbances of the circulation affecting the nervous system result in symptoms of a magnitude commensurate with the number, the size, and the damaging effect of the resulting lesions. In poliomyelitis, the magnitude of the capillary defect increases with the clinical severity of the disease. Boines⁹ concluded: "We believe that therapeutic profits in the clinical management of poliomyelitis can be realized more readily with the restoration of normal capillary integrity."

In the management of the poliomyelitis patient, we deem it essential to secure a relaxed state as quickly as possible in order to restore

some degree of ease to the tense individual. Our experiences with Dimethylane,^{5,10-13} a 2,2-diisopropyl derivative of 2 substituted-4-hydroxymethyl-1, 3-dioxolone, prompted us to use this compound in our poliomyelitis patients. We incorporated this therapeutic agent into our armamentarium as only an adjunct for the purpose of producing a desirable state of relaxation.

Dimethylane is available in 0.25 gm. enteric-coated capsules. Pediatric dose schedule is 1 capsule every four hours for 3 doses daily and continued for at least ten days, then 2 capsules at bedtime thereafter as long as needed. In adults, the schedule is 2 capsules after breakfast, 1 after lunch, and 2 at bedtime as long as necessary. Similar amounts are given to parents who are in need of attention because of anxiety-tension states. After the fifth day, the dose is reduced to 1 capsule three times daily for five days or longer, according to the requirements of the patient.

Relaxation is an escape from strain or tension. We have observed relaxation of tense muscles without loss of muscle strength during Dimethylane treatment.

We now return to the capillary system. Our purpose is not to review the subject relating to the intercellular substance and the importance of vitamin C to normal capillary resistance. We do want to point out that practically all of our poliomyelitis patients manifested abnormal capillary fragility by the presence of ecchymotic areas on arms, thighs, or legs or by the capillary fragility test. This test is a positive cuff-pressure test in which the pressure cuff is applied to the arm above the crease of the elbow, and a pressure equal to one-half of the sum of the systolic and diastolic is maintained for at least two minutes. The cuff is removed and five minutes later the arm is examined for petechiae.

To correct this abnormality of the capillary system, we used Hesper-C, a combination of 100 mg. of hesperidin and 100 mg. of ascorbic acid in capsules. We prescribe 2 capsules after meals and at bedtime until the capillary fragility test is negative or almost negative. This improvement in capillary resistance has a beneficial psychologic effect on the patients.

We appreciate that we are only the handymen for nature in the management of these patients. It is true that we treat the patient, but it is equally true that nature tends to the healing. To render unto nature the fullest cooperation possible, we must supply those elements which help repair capillary damage so that the normal physiologic function can continue and remove those substances which interfere with healing. Extensive

medical literature shows that Hesper-C possesses the capacity to establish such repair in an impaired capillary system. Furthermore, Hesper-C has proved to have the capacity to protect the capillary system from repeated insults, regardless of origin.

At times the physician is pressed by some paralytic adults about the disability that may result and the future adjustments they must make. As was pointed out, the physician must give his optimism free rein to exceed any discouragement he may feel. The conscientious physician considers all of the consequences that might result because of the disease, as well as the management of the disease so that greatest therapeutic profits are gained in the shortest possible time. We have developed a therapeutic procedure which has greatly increased our salvage rate, and has considerably reduced hospitalization compared with results of only several years ago. Our exhibit on this subject attracted much favorable comment at the annual meeting of the American Medical Association in Atlantic City, New Jersey, in June 1955.

The cooperation of the immediate members of the family becomes a very important tool in the psychologic preparation of the family. Our present methods of rehabilitation and vocational training prepare every patient, regardless of the extent of involvement, to carry on some gainful activity so that financial and social independence can be assured. Orthopedic surgery, performed at the proper time, has a great deal to offer the severely paralyzed patient.

The poliomyelitis patient should be permitted—in fact, he should be required—to take care of himself to the best of his abilities in order to teach him to be self-reliant. The young patient should not be showered with attention, nor should he receive special considerations. With proper guidance and understanding, the poliomyelitis patient makes every effort to adjust himself physically, socially, and psychologically. And—with very few exceptions—success is the reward.

The emotional stress and anxiety-tension state are intensified by the financial burden placed on the family for the long-term care required in some cases of poliomyelitis. These distressed people should be informed that their financial load can be lessened by assistance from local chapters of the National Foundation for Infantile Paralysis, as well as assistance from federal and state agencies interested in the welfare of crippled children. These agencies are also ready to supply schooling and vocational training.

The community health departments, the vari-

ous medical and social groups, and, in particular, the general practitioner can do much in lessening the public tension and fear regarding poliomyelitis. This can be accomplished by being adequately prepared to cope with an outbreak of the disease and keeping hysteria to a minimum. All possible precautions should be taken and preparations made in a systematic way, so that the public has evident assurance that in case of an outbreak the best possible medical, spiritual, and financial care are available.

The success of the above program depends on the general practitioner, because he takes into

account the patient, the patient's socio-economic status, his family, as well as treatment of the disease. The emergence on the medical horizon of the many medical specialties has increased the importance of the general practitioner. What specialist is accepted as a friend or father confessor at times and takes time to deal with his patient's fears and anxieties?

The answer is the general practitioner, and as one of our older patients said, "God Bless Him!"

Dimethylane and Hesper-C are products of The National Drug Co., Philadelphia.

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PSYCHOLOGIC PROBLEMS may arise in the patient with myasthenia gravis because of the need for continuous medication and the stress and dependency resulting from the physical handicap.

Maria Brolley, M.D., and Marc H. Hollender, M.D., believe that patients should be told that the disease is chronic, treatable but not curable, and requires medication indefinitely. Discussion of these points gives the physician the opportunity to stress the hopeful aspects of the situation and to alleviate anxiety. Disturbing or discouraging information should not be given unnecessarily. If the patient understands the rationale of therapy, cooperation is easier.

Attitudes toward medication reflect adjustment to the illness. Overdependent patients may avoid the responsibility for treatment; other patients, seeking to deny dependency, may refuse to admit the illness and strive to carry on an active life in spite of the handicap. Neglect of or compulsive adherence to medication schedules may be defense mechanisms. An attempt at realistic self-regulation indicates active participation in rehabilitation.

Myasthenia gravis, like any disabling disease, aggravates dependency feelings. Dependent people may tolerate invalidism with few emotional repercussions but often respond poorly to rehabilitation; with others, reactions are reversed. The threat which the disease presents to integrity of the body and to life causes fear in most patients and may stimulate euphoria or blind faith in drugs and doctors as a defense. Some patients interpret the illness in the light of coexisting emotional disturbances, accepting the disease as penalty.

Symptoms of the disease are intensified by anger and envy. Muscular tension, not increased sympathetic nervous system activity, may account for exacerbation, since ephedrine relieves symptoms.

MARIA BROLLEY, and MARC H. HOLLENDER: *J. Nerv. & Ment. Dis.* 122:178-184, 1955.

Adrenocortical Insufficiency in Infants

Diagnostic Features

THEODORE C. PANOS, M.D.

Galveston, Texas

IT IS INDEED an honor to be given the opportunity to participate in this commemoration program for Dr. Irvine McQuarrie. The dispersion of his former students into key teaching and research positions in a large number of major university centers provides ample testimony of an unusual ability to inspire intellectual curiosity and to further pursuit of scientific and teaching endeavor. The attendance at these proceedings and the scope of the celebration provide additional heartening testimony to the high esteem in which Dr. McQuarrie is held as an individual and a friend. It is with deep personal gratification, therefore, that I am able to present this paper as a token of my own affection for and indebtedness to him. It is particularly fitting that I should discuss a problem relating to adrenocortical function, since Dr. McQuarrie's many fundamental contributions to this field are well known.

The increasing frequency with which adrenocortical insufficiency in infants is being reported is an index of heightened awareness of this entity. Difficulties in the early establishment of a specific diagnosis still abound, however, in spite of the prodigious research of recent years into the normal and abnormal physiology of the adrenal cortex. Although much progress has been made, there is as yet no entirely satisfactory laboratory means by which an exact and pinpoint identification of adrenocortical insufficiency can always be made. Diagnosis, therefore, still depends primarily on critical clinical observation.

The purpose of this presentation is to analyze the salient clinical features of adrenocortical insufficiency in 16 infants observed since 1947 at the University of Texas Medical Branch.

MATERIALS AND METHODS

Details of the diagnostic work-up are included in the case summaries. Diets given were those commonly employed for infants of this age. Determinations of serum sodium, potassium, and chloride were made at frequent intervals according to the needs of the patients or the plan of the study, and were carried out by the methods

regularly used in this department.¹⁻³ Total urinary 17-ketosteroid (17-KS) excretion was determined according to the method described by Dreker and associates.⁴ Urinary 17-hydroxycorticoid (17-OH) excretion was determined according to the method of Reddy and associates.⁵ First attention, of course, was given to emergency therapeutic measures against shock and dehydration. Subsequently, the patients were maintained with sodium chloride, desoxycorticosterone acetate (DOCA), adrenocortical extract (ACE) and cortisone, alone or in varying combinations. Whenever DOCA was used, potassium chloride in amounts of 1 to 3 gm. daily was constantly administered. Also, the administration of DOCA was followed at frequent intervals with blood pressure recordings, electrocardiograms, 2-meter chest films for cardiac size, and urinalyses for albuminuria or hematuria.

CASE PRESENTATIONS

Cases 1 and 2 were subjects of a previous report by the author.⁶

Case 1. H. P., female, was admitted at the age of 4 months with a referring diagnosis of "pyloric stenosis." Patient had been a severe feeding problem since birth because of episodes of vomiting which were frequently projectile, failure to gain in spite of excellent intake, and diarrhea. On admission she presented a picture of shock and the pathognomonic serum electrolyte changes of adrenocortical insufficiency. The diagnosis of female pseudohermaphroditism was established by urethrocystoscopy, colpolysterostalpingography, exploratory laparotomy, elevated urinary 17-KS, and, of course, by the classical appearance of the external genitalia. After emergency therapy, the patient was controlled with 2.5 mg. of DOCA daily and 5 gm. of NaCl. daily. Several weeks later and after varying therapy to illustrate the relative importance of DOCA and NaCl., the patient was satisfactorily maintained on 5 gm. of NaCl. daily for at least two years, after which time no further follow-up was obtained. Efforts to contact the patient have been unsuccessful.

Case 2. E. V., female, was admitted at the age of 3 months with a referring diagnosis of "feeding problem and hypospadias." Patient had failed to gain since birth in spite of a voracious appetite and developed vomiting which was frequently projectile and diarrhea at about the age of 1 month. On admission, the patient was in a shock-like state and her weight was less than at birth. The classical serum electrolyte changes of adrenocortical insufficiency were present. There was no fall in circulating

eosinophils following the injection of 15 mg. of ACTH. A diagnosis of female pseudohermaphroditism was established by measures identical to those mentioned in case 1. After emergency therapy, the patient was controlled with 2.5 mg. of DOCA daily and 5 gm. of NaCl. daily. The former was gradually reduced and discontinued after six weeks. The patient continued to thrive on maintenance NaCl. for nearly two and one-half years, after which she failed to return for her follow-up examination. It was learned by letter that two months after her last visit she expired during a fulminating respiratory tract infection.

Case 3. B. P., female, was admitted at the age of 11 months. Genital abnormalities typical of female pseudohermaphroditism were noted at birth. Vomiting began during the first week, became frequent and projectile by the third week and she developed anorexia. By the fifth week she was hospitalized because of a "sinking spell," a diagnosis of adrenocortical insufficiency was made and she responded dramatically to therapy with ACE and saline. She was discharged on 1 gm. of NaCl. daily and sporadic irregular injections of DOCA. For the next several months she had recurrent episodes of nausea and vomiting alternating with weight gain, depending on the frequency of administration of DOCA. By the time of admission, the height was fiftieth percentile for one year, but weight was fiftieth percentile for six months. Appetite was good, but the patient vomited repeatedly. The diagnosis of pseudohermaphroditism was established by cystoscopy, colpolysterosalpingography, elevated urinary 17-KS (5.47 mg./24 hr.), and the presence of typical external genitalia. Serum electrolyte changes were indicative of adrenocortical insufficiency. Several control eosinophil counts were below 50 per cubic millimeter. A twenty-four-hour ACTH test was performed in which serum electrolyte studies and urine for 17-KS and 17-OH excretion were determined during a pre- and post-test period as well as during the twenty-four-hour period when 40 units of Acthar gel were given. The results indicated a significant rise in excretion of 17-KS and 17-OH and a fall in serum Na. A mild crisis developed as the test was nearing completion. Daily doses of 1 mg. of DOCA and 5 gm. of salt were administered to control the insufficiency, and 100 mg. of cortisone was given intramuscularly daily to suppress masculinization and excessive growth. Maintenance doses eventually achieved were 12.5 mg. of desoxycorticosterone trimethyl acetate intramuscularly once a month, 3 gm. of NaCl. daily and 37.5 mg. of cortisone daily by mouth. She was reported to be doing well six months after discharge.

Case 4. M. B., female, was admitted at the age of 5 months because of intermittent vomiting, persistent dehydration, poor weight gain, and occasional diarrhea since birth. A diagnosis of adrenocortical insufficiency was made at 2 months of age, and therapy with DOCA and salt resulted in dramatic improvement. An attempt was made to substitute cortisone for the DOCA with recurrence of vomiting and poor gain, which disappeared after reinstitution of DOCA. At the time of admission height and weight were in the fiftieth percentile for three months. The genitalia were those of a normal female infant. An ACTH-eosinophil test on two occasions resulted in 86 per cent and 66 per cent fall in circulating eosinophils. Daily doses of 2 mg. of DOCA and 3 gm. of NaCl. were given with excellent weight gain and clinical improvement. After two weeks, the blood pressure rose from 120/70 to 180/80 and remained at the latter figure until discharge without significant symptomatology or laboratory effect. Gradual withdrawal of DOCA was accomplished without

untoward effect except for weight loss of 300 gm. in eleven days. While still on 3 gm. of NaCl. daily, a twenty-four-hour ACTH test was performed. There was a significant rise in urinary 17-KS and 17-OH excretion, but instead of a pronounced decrease in urinary Na. excretion, an increase was observed indicating that ACTH had resulted in salt excretion rather than salt retention. (See figure 2 and under Diagnostic Measures for interpretation.) Later, salt was gradually withdrawn without apparent effect and the patient was discharged. DOCA and salt had to be reinstituted three months later, during the course of an acute infection, but were again gradually withdrawn. In another three months, she was reported to be in excellent condition and in the sixtieth percentile for height and weight for age.

Case 5. C. K., female, was admitted at 3½ months of age because of failure to gain since birth, in spite of a huge intake of milk, dehydration, and, beginning at 8 weeks, persistent vomiting and occasional episodes of diarrhea. After numerous changes in feeding regimen without avail, a diagnosis of adrenocortical insufficiency was made during a classical crisis and therapy with DOCA and salt was begun. This resulted in clinical improvement but with continued failure to gain. Cortisone was added to the regimen without pronounced benefit and she was referred to the Children's Hospital for study. At the time of admission she was the size of a newborn infant and, with minor fluctuations, remained so throughout her seven-month stay before death, in spite of a fluid intake exceeding 250 cc. per kilogram daily and caloric intake of 130 calories per kilogram daily. DOCA in amounts varying from 1 to 4 mg. daily, NaCl. from 3 to 6 gm. daily, cortisone from 12.5 to 37.5 mg. daily, and ACE from 10 to 30 cc. daily were given in varying combinations. The clinical effect was fairly good in that the serum electrolytes remained normal, the infant usually remained alert and cheerful, and vomited only occasionally. However, there was complete failure to gain. There were repeated episodes of severe vomiting. Fasting glucose was 78 mg. per cent. Testosterone propionate in amounts of 5 mg. every other day was instituted for several weeks without benefit. Serum protein-bound-iodine (PBI) was 3.2 µg. on one occasion and 1.1 µg. several days later, both figures obtained while the patient was receiving 25 mg. of cortisone daily by mouth. Thyroid extract was then added to the regimen with an apparent beneficial effect on weight gain which was not sustained; the PBI rose to 5.1 within a five-week period. A diagnosis of primary pituitary insufficiency was considered as a possible explanation for the apparent combined hypoadrenocorticism and hypothyroidism. A forty-eight-hour ACTH test was performed, the results of which revealed no increase in urinary 17-KS or 17-OH, but a definite and sharp decrease in urinary sodium excretion, indicating responsiveness of the mineral corticoid zone of the cortex. The day after cessation of ACTH, the patient began to vomit, lost weight precipitously, and developed a crisis which demanded emergency therapy. Somewhat later, a thyroid-stimulating hormone (TSH) test was done. The twenty-four-hour urinary excretion of a test dose of I^{131} before TSH was 87.3 per cent, and the thirty-minute thyroidal uptake was 11.3 per cent. After 20 mg. of TSH daily for three days, the urinary excretion of a test dose of I^{131} fell to 34.3 per cent and the thirty-minute thyroidal uptake rose to 33.5 per cent, indicating activation of a previously somewhat dormant thyroid gland. The results of these two tests were interpreted as indicating inadequate production of ACTH and TSH by the patient's own anterior

pituitary gland. However, suppression of thyroid function due to cortisone could not definitely be ruled out.

Persistent dehydration and episodic vomiting marked the clinical course, in spite of vigorous therapy. Finally, the patient developed acute bronchiolitis from which she was improving when she aspirated vomitus and expired. At autopsy, the adrenals were pale and small, with a combined weight of 1.3 gm. The pituitary was removed en bloc with the sella turcica and fixed. The microscopic sections have not yet been completed.

Case 6. R. W., female, was admitted at 8 weeks of age. History revealed delayed respiration and cyanosis at birth, necessitating artificial resuscitation; sucking reflex was poor for the first week. Thereafter she did well for seven weeks when she developed a milk respiratory infection which responded well at first, but recurred in one week with the development of classical adrenocortical crisis. After emergency treatment with ACE, cortisone, and salt, she was referred to the Children's Hospital for further management. Because intense therapy was necessary, no specific diagnostic studies were possible, but bilateral heavy calcifications of the adrenal glands were observed in roentgenograms taken for intravenous pyelography. The respiratory infection ran a stormy course, but, after recovery, the ACE and salt were gradually withdrawn over a period of weeks without harmful effect. She was reported to be thriving and well six months later.

Case 7. M. A., male, was admitted at the age of 10 weeks with a history of failure to gain since birth in spite of a voracious appetite. This continued until just before admission when he became irritable and vomited repeatedly. Upon admission he was in a shock-like state and the serum electrolytes were typical of adrenocortical insufficiency, but the eosinophil count dropped from 250 to 50 following ACTH. Enlargement of the scrotum and penis were noted, with minimum hyperpigmentation at the base of the penis; testes were small and descended. 17-KS were 15.9 mg./24 hr. Response to DOCA and salt was prompt, but DOCA implants plus salt were required for maintenance for nearly two years. Cortisone was added to suppress masculinization. He has continued to do well after nearly four years.

Case 8. B. D., began to vomit, developed listlessness and circulatory collapse after circumcision at age of 6 days. He was treated with intramuscular cortisone alone at first and later with the addition of 1 tsp. of salt daily for one week. Attempts to change to oral cortisone resulted in recurrence of vomiting. He was maintained on intramuscular cortisone alone until the age of 6 months when he was admitted to the Children's Hospital because of recurrent vomiting. Physical examination revealed the pronounced "moon-face" and obesity typical of Cushing's syndrome. The penis was small and testes descended. Height and weight were in the twenty-fifth percentile for age. Numerous blood pressure recordings were 280/100 but the readings were not considered accurate because of the extreme obesity of the arm. Serum electrolyte changes were those pathognomonic of adrenocortical insufficiency. The urinary 17-KS excretion was 4.02 mg./24 hr. Salt was added to the regimen to a total of 5 gm. daily with cessation of vomiting. It was later reduced to 4 gm. daily, but total urinary excretion of sodium one day later revealed the equivalent of 5 gm. NaCl. so the salt was increased to 5 gm. daily and 1 mg. of DOCA was begun. The infant continued to feed well and was cheerful until the ninth hospital day when he began to vomit, developed pronounced tachypnea and air hunger. Serum electrolytes drawn that morning revealed considerable im-

provement and examination did not indicate impending crisis. Despite vigorous supportive therapy, including ACE, the patient expired. At autopsy, the adrenals were unusually large and deeply pigmented. There was a large premortem thrombus of the pulmonary artery, completely occluding the right branch and partially occluding the left branch. This, then, was a case of adrenogenital syndrome with insufficiency with excessive treatment with cortisone and complicating pulmonary artery thrombosis and death.

Case 9. D. H., male, was admitted at the age of 1 month because of polyuria and failure to gain since birth and the development of a severe and classical adrenocortical crisis at 4 weeks of age. Following emergency therapy, there was a dramatic response to DOCA and NaCl. and maintenance dosages achieved were 1 mg. and 5 gm., respectively. There was no eosinophil response to ACTH. At 5 weeks of age, the urinary 17-KS were 2.8 mg./24 hr. Since this indicated a diagnosis of adrenogenital syndrome, cortisone was added to the regimen, the maintenance dose achieved being 25 mg. daily orally, and the patient was discharged. Within a few days, he was re-admitted in crisis due to failure of the mother to provide the stipulated addition of salt to the diet. After emergency therapy, maintenance was quickly re-established. Three weeks after the second admission, the blood pressure was observed to have risen from 135/60 to 160/120 and then to a high of 250/150. It remained at an average level of 180-190/120-140 for nearly three months before spontaneously returning to control values. The gradual withdrawal of DOCA first and then of cortisone and substitution with ACE had no ameliorating effect. Benzodioxane and Regitine tests were negative as was a therapeutic trial with Apresoline. Hexamethonium chloride was administered for nine days with some reduction in systolic pressure but none in diastolic pressure, and it was therefore abandoned. The patient showed little symptomatic effect until about the sixtieth day when signs of early congestive failure appeared and digitalization was carried out; one month later the pressure gradually receded to 130-140/60. Cortisone was then cautiously re-introduced and ACE gradually discontinued. For the next four months he did well on cortisone and salt, but he began to vomit frequently and was re-admitted. Cortisone was increased to 37.5 mg., salt to 6 gm., and 8 to 24 cc. of ACE were given with pronounced improvement. While preparations for discharge were being made, he developed a fulminating pneumonia in spite of adequate prophylaxis with antibiotics and expired suddenly. At autopsy, the adrenals weighed 4.49 gm. and appeared essentially normal. The failure to demonstrate hyperplasia was attributed to the continuous cortisone therapy for over one year.

Case 10. W. M. B., male, was admitted on the ninth day of life because of convulsions and vomiting since the second day. Labor had been hastened by intravenous Pitocin, but the immediate neonatal course was reportedly uneventful. Because a previous sibling had died during the neonatal period and the adrenals had been found absent at autopsy, the local physician performed two ACTH-eosinophil tests with a pronounced fall in eosinophils on each occasion. Later a two-day therapeutic trial with ACTH did not relieve the vomiting and the patient was referred to the Children's Hospital. On admission, lethargy, hypotonia, and pallor were noted. The Moro reflex was weak and the rooting and sucking reflexes were absent. There was pronounced overlapping of the cranial sutures. Lumbar puncture revealed 298 cells, 135 mg.

protein; one week later, there were 3 cells and 107 mg. protein. Subdural punctures were negative. Serum electrolyte values were normal and remained so until the day before death when the Na. was 133 mEq./l. A primary diagnosis of birth injury was made, and the patient was maintained on parenteral fluids for two days, after which oral feedings were introduced. An ACTH-eosinophil test was performed with a 58 per cent decrease in circulating eosinophils. Vomiting markedly decreased, but the infant failed to gain. On the nineteenth hospital day, repeated vomiting recurred requiring temporary management with parenteral fluids. A repeat ACTH-eosinophil test showed a 53 per cent fall. At this time it was decided that the patient probably had adrenocortical insufficiency in spite of normal electrolytes and eosinophil tests. Therapy with salt, ACE, and cortisone was begun. The following morning, however, the patient aspirated an emesis and shortly thereafter expired. At autopsy, no adrenals were found and careful search of the thoracic, abdominal, and scrotal contents revealed no aberrant adrenal tissue.

Case 11. W. B., male, was admitted at the age of 5 weeks because of projectile vomiting since birth, poor weight gain, polyuria, and constipation. A diagnosis of pyloric stenosis was made and operation performed five days later. A questionable pyloric tumor was found. Transitory improvement occurred postoperatively, but vomiting and dehydration in spite of huge oral intake of fluid were persistent. An ACTH test revealed no fall in circulating eosinophils. Serum electrolyte changes gradually assumed the pattern characteristic of adrenocortical insufficiency. DOCA and NaCl. were added, 1 to 2 mg. and 3 to 5 gm., respectively, with prompt disappearance of vomiting and dehydration, but with rather poor weight gain. Hypoglycemia was not present but an intravenous glucose tolerance test revealed a flat curve. Cortisone was added to the regimen, and within a few days weight gain improved and became steady. Gradually the DOCA was discontinued and the patient continued to thrive on 25 mg. of cortisone and 5 gm. of salt daily. After fifteen months the patient was discharged on this regimen. Frequent follow-ups reveal that the patient continued to do well. At 2 years of age the cortisone was gradually withdrawn and later the salt with no adverse effect. When last seen at 4 years of age, the patient was in the twenty-fifth percentile for height and weight for age and had been entirely well, having withstood several respiratory tract infections without undue difficulty.

Case 12. V. G., male, was admitted at the age of 7 months because of episodic diarrhea since birth, persistent dehydration, and failure to gain in spite of a voracious appetite, and frequent projectile vomiting. The diarrhea improved markedly when he was placed on celiac regimen at 4 months of age, but failure to gain and polyuria continued to be prominent. At the time of admission he weighed only 3 lb. more than at birth and length was fiftieth percentile for three months. The celiac regimen was continued in the hospital with varying success. Polyuria and polydipsia were very conspicuous. On 2 occasions, the twenty-four-hour excretion of Na. was measured while the patient was receiving 3 gm. of NaCl. as a daily supplement in addition to that contained in milk; the excretions were equivalent to 4.5 and 5.0 gm. NaCl. daily indicating "salt diabetes." The total eosinophil count did not fall following ACTH. The serum electrolyte changes, although suggestive, were never quite characteristic of adrenocortical insufficiency. However, intensive parenteral fluid therapy was repeatedly required during the recurring bouts of diarrhea. DOCA 3 mg., NaCl. 3 to 6 gm.

and cortisone 25 to 50 mg. were given during the two-month hospital stay and the patient gained 3 lb. The diarrhea was never overcome for a prolonged period. Finally, at 9 months of age, the patient expired suddenly without obvious cause. At autopsy, the adrenals were very hypoplastic, weighing 600 mg. each and microscopic examination revealed pronounced atrophic changes.

Case 13. B. S., male, was admitted at the age of 10 weeks because of an intake of prodigious quantities of milk mixture since birth, persistent dehydration, failure to gain, and moderate diarrhea. By 9 weeks of age the patient had begun to vomit occasionally, but diarrhea had improved and spontaneous fluid consumption frequently reached 450 to 500 cc. per kilogram per day. Upon admission, the patient was marasmic and height and weight were those of a large newborn infant. A random eosinophil count was 55; later, the injection of epinephrine brought about a 50 per cent decrease in eosinophils. On 2 occasions, the twenty-four-hour urinary excretion of sodium exceeded the intake. The patient was placed on 2 mg. of DOCA daily and 3 gm. of NaCl. daily with immediate cessation of diarrhea and vomiting but slow weight gain. The increase of NaCl. to 5 gm. daily resulted in rapid steady weight gain. An attempt to withdraw the DOCA resulted in recurrence of vomiting, diarrhea, weight loss, and dehydration which promptly disappeared after resumption of DOCA. He continued to improve until he was discharged at 5 months of age on 1 mg. of DOCA and 3 gm. of NaCl. Therapy was gradually discontinued after the patient was 1 year of age without untoward effect and at the last report one year later he had continued to do well.

Case 14. J. B., male, was cyanotic and apneic following delivery by cesarean section at the University of Texas Hospitals. Resuscitation was difficult. On the second day, he developed fever, respiratory distress, listlessness, and collapse. Serum electrolyte changes were typical of adrenocortical insufficiency. Lumbar and subdural puncture, chest roentgenogram, and cultures of blood, spinal fluid, and nasopharynx were negative. He was placed on ACE, salt, and cortisone with prompt improvement. As improvement continued, these were gradually withdrawn after two weeks, without untoward effect.

Case 15. J. A., male, was observed to have a weak cry, cyanosis, and poor respirations after an uneventful delivery at the University of Texas Hospitals. Within a few hours, he developed pallor, circulatory collapse, and difficult respiration. He expired at 10 hours. Bilateral massive hemorrhagic necrosis of the adrenals was demonstrated at autopsy.

Case 16. G. A., male, was admitted in critical condition at the age of 22 months with bilateral bronchopneumonia due to *Hemophilus influenzae*. Respirations were deep and gasping; the patient was cyanotic and in shock. Despite heroic therapy, the patient expired five hours after admission. Bilateral massively hemorrhagic adrenals were demonstrated at autopsy.

Some features of the cases just described are summarized in table 1. The sex distribution is as might have been expected, as is the fact that the largest single group is that associated with the congenital form of the adrenogenital syndrome. In 4 cases, hemorrhagic adrenals are listed as the cause. Autopsy proved 2, cases 15, 16. In the third, case 6, the finding of bilateral adrenal calcification by roentgenogram at 8 weeks of age, with a history of a severe cyanotic and

TABLE 1
STATISTICAL ANALYSIS OF CASES

Number of cases	16
Sex: Male	10
Normal male	7
Infant Hercules	3
Female	
Normal female	3
Pseudohermaphrodite	3
Age at onset	
within first week of life	14
at 8 weeks	1
at 22 months	1
First symptom or sign	
vomiting	6
polydipsia	4
collapse	4
polyuria	1
diarrhea	1
Frequency symptoms and signs	
dehydration	13
failure to gain	12
vomiting	12
polydipsia	7
polyuria	5
diarrhea	4
pigmentation	1
Etiology	
adrenogenital syndrome	6
hemorrhagic adrenals	4
aplasia	1
hypoplasia	1
pituitary insufficiency	1
unknown	3
Mortality	8
Temporary insufficiency	5
Still under treatment	3

apneic episode after birth, makes a diagnosis of hemorrhage into the adrenals with reduction in adrenocortical reserve virtually certain. The fourth, case 14, may logically be assumed to have had hemorrhagic adrenals, inasmuch as crisis developed on the second day of life after a severely anoxic episode at birth. The association between neonatal anoxia and adrenal hemorrhage is well known.

Conspicuously absent from the clinical evaluation of these patients was evidence for deficiency of glucocorticoid secretion, except for the failure of the eosinophil count to decrease after ACTH in 4 of 8 cases so studied. Fasting glucose values were normal in 9 and not studied in the remainder because of steroid therapy. Oral glucose tolerance tests were performed in 4. The curve was normal in 2 and flat in 2. In 1 patient, case 11, in whom several fasting glucose values were normal, but the oral glucose tolerance curve was flat, therapy with NaCl and DOCA brought about remarkable clinical improvement and reversal of electrolyte changes and dehydration.

However, consistent weight gain did not occur until cortisone was added to the regimen, a result representing cogent circumstantial evidence of glucocorticoid deficiency. The infrequency with which signs of glucocorticoid deficiency can be demonstrated in infants is in marked contrast to the picture in older children and particularly in adults, in whom hypoglycemia is found in 50 per cent and some abnormality of carbohydrate metabolism in 75 per cent.⁸

Likewise conspicuously absent was evidence of pigmentation, which was observed in mild degree in only 1 patient. This is in striking variance with Addison's disease in children and adults, in whom pigmentation is characteristically found in nearly every patient.^{7,8}

DIAGNOSTIC MEASURES

Clinical Appraisal. Of the 16 patients, the onset was acute in 4, with initial development of crisis. In the remaining 12, the onset occurred during the first week of life, was subacute, and more or less insidious. The signs and symptoms in these patients comprise a pattern so distinct and uniform that they are set apart as representative of the characteristic clinical picture of adrenocortical insufficiency in infants.

It can be seen from table 1 that persistent dehydration, vomiting, failure to gain, polydipsia, and polyuria constitute the most commonly observed pattern taken by adrenocortical insufficiency in infants. Early vomiting is characteristic in contrast to the late vomiting usually observed in Addison's disease of adults, and is frequently projectile in nature. This feature may lead to confusion with pyloric stenosis. When diarrhea occurs, the stools tend to be yellow, watery, and odorless without pus or blood. The complaint of polydipsia as the initial sign of insufficiency is particularly noteworthy, having occurred in 4 patients. Anorexia and listlessness are almost always relatively late findings or at least develop after electrolyte and water depletion have led to significant dehydration and constriction of plasma volume; these signs therefore, may be considered harbingers of impending crisis.

The sequence of appearance of signs and symptoms and the characteristic clinical syndrome presented by this group of patients make it apparent that the fundamental defect is in the adrenocortical control of electrolyte and water balance. This observation has frequently been made regarding the insufficiency accompanying the adrenogenital syndrome, but it will be noted that only 6 of the group fall into this category.

The association of any combination of the

above findings with the distortion of electrolyte pattern which is so characteristic of adrenocortical insufficiency permits an exact and final diagnosis. None of the numerous tests yet described seem to possess the positive clinical value of the demonstration of decreased serum sodium and chloride and increased serum potassium. Such electrolyte changes, therefore, may be considered pathognomonic of adrenocortical insufficiency.

ACTH-eosinophil test. This test was performed in 8 patients. The others were either first seen in crisis and, therefore, vigorously treated or had received cortisone prior to admission and were maintained on varying amounts of this drug. There was no response to ACTH in 4 cases and a significant, over 50 per cent, fall in the remaining 4. The limitations of this test are immediately apparent. Whereas the failure of the eosinophils to decrease in number tends to indicate ("rule in") the diagnosis of adrenocortical insufficiency, a significant decrease by no means eliminates ("rules out") the diagnosis. This is particularly exemplified in the history of case 10 in whom no adrenal tissue could be found at autopsy. On 3 occasions, ACTH produced a fall of 75 per cent, 58 per cent, and 52 per cent, respectively. Thus, as is true of so many tests of adrenocortical function, this test is of more value in the negative sense than in the positive.

ACTH-steroid and electrolyte excretion test. The methods used were similar to those previously described by Wilkins and associates⁹ in the study of patients with adrenal hyperplasia and Klein¹⁰ in the study of newborns and very young infants. The measurement of urinary sodium excretion was considered necessary because, as has been emphasized, adrenocortical insufficiency in infants tends to be exclusively of the mineral-corticoid type and evaluation of this aspect of adrenocortical response is relatively of much greater importance than in adults. ACTH was given in dosage of 40 units daily. Urinary 17-KS, 17-OH, sodium, and potassium excretions were determined, before, during, and after ACTH. Special attention will be devoted to the 17-OH and sodium values. The use of this test on 2 patients will be cited.

Figure 1 depicts the changes produced by the twenty-four-hour ACTH test in a control subject. The sharp increase in 17-OH excretion is apparent and indicative of good glucocorticoid response, whereas the corresponding decrease in sodium excretion is indicative of normal mineral-corticoid response. In figure 2 are seen the results of an identical test performed on case 4, in whom the injection of ACTH produced the expected rise in 17-OH excretion, but caused a sodium

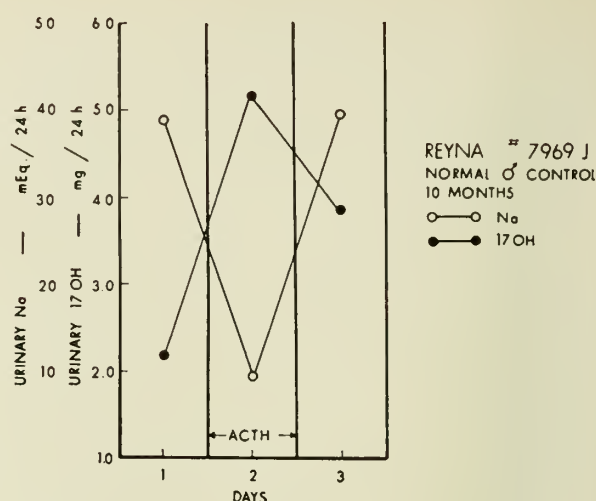


Fig. 1. Results of a twenty-four-hour ACTH test on a normal control subject. Sharp rise in 17-OH excretion and corresponding decrease in sodium excretion are to be noted. No significant change in potassium excretion occurred, and there was a modest, but significant, increase in urinary 17-KS.

diuresis rather than retention. In view of the history of the patient and the dramatic response to DOCA and salt, this test established the fact that the adrenocortical insufficiency was specifically and exclusively of the mineral-corticoid type. Available knowledge permits little speculation as to the etiology of such specific deficiency. Sodium diuresis in response to ACTH has been shown to occur in newborns and very young infants¹⁰ and in patients with the adrenogenital syndrome.⁹ The patient, a normal 10-month-old female with normal urinary 17-KS values, fits into neither category, but responded to ACTH in an essential-

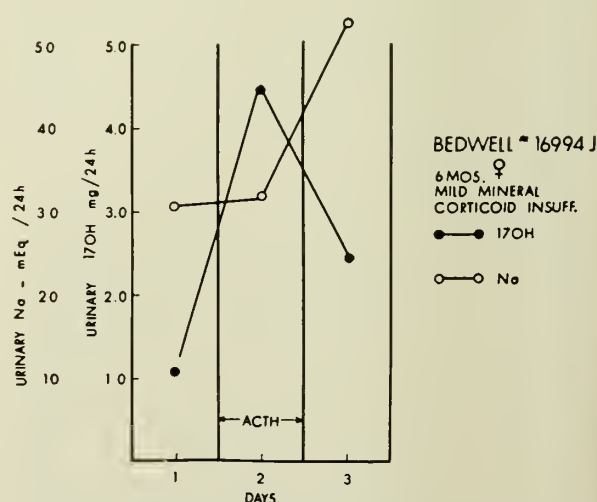


Fig. 2. Results of a twenty-four-hour ACTH test on case 4. Expected rise in 17-OH excretion occurred, but there was an increase rather than a decrease in urinary sodium excretion. A slight increase in potassium excretion as well as a modest increase in 17-KS excretion also occurred.

ly identical manner. The likelihood that the cortical hyperplasia in patients with the adrenogenital syndrome can produce substances which promote salt-excretion has been demonstrated by Wilkins and associates.⁹ It is at least feasible that nonandrogenic hyperplasia capable of a similar effect on salt-excretion may persist for varying periods in some infants, producing temporary adrenocortical insufficiency such as was seen in this case and in cases 11 and 13.

A twenty-four-hour ACTH test was also performed on case 3, a female pseudohermaphrodite. The injection of ACTH induced a crisis in the same manner and with essentially the same findings as reported by Wilkins and associates.⁹ A positive diagnosis of adrenocortical insufficiency was thus established, although in this case it was apparent prior to the test.

SUMMARY AND CONCLUSIONS

1. The study of 16 cases of adrenocortical insufficiency in infants has been reviewed and categorized.

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2. The onset was acute in 4, with rapid development of crisis. In the remaining 12, the clinical picture was so typical that it constituted a syndrome with the following characteristic features: (a) onset within first week of life, (b) persistent dehydration, (c) failure to gain, (d) early vomiting which was frequently projectile, (e) polydipsia and polyuria, (f) occasionally diarrhea, and (g) relatively late development of anorexia and listlessness.

3. Mild pigmentation developed in 1 patient. An additional patient failed to gain weight until cortisone was given, indicating glucocorticoid deficiency.

4. Positive diagnosis was most frequently made by the demonstration of the pathognomonic serum electrolyte changes in the presence of the clinical picture described.

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BIRTH WEIGHTS are significantly lower for infants with fibrocystic disease of the pancreas than for healthy infants, Paul H. Boyer, M.D., Columbia University, New York City, believes that maternal or fetal metabolic factors may be responsible for the discrepancy.

Mean birth weights of children with fibrocystic disease were lower than those of a comparable group of healthy infants by 299 gm. for females and 241 gm. for males. Among healthy infants, 4.8 per cent of the males and 3.5 per cent of the females weighed less than 2,500 gm. at birth, while birth weights of 9.1 per cent of male and 16 per cent of female infants with fibrocystic disease were below this level.

Women who had previously given birth to a child with fibrocystic disease were fed a diet rich in proteins, vitamins, and minerals, providing 2,500 to 2,800 calories daily during pregnancy. Mean birth weight of children born to these women was slightly higher than that of infants born to women not given a special diet.

PAUL H. BOYER: *Pediatrics* 16:778-784, 1955.

New Fecal Softener (Doxinate) in the Treatment of Constipation

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THE PROBLEM of constipation is universal. Over the years literally thousands of drugs, diets, and fads have been advocated and have met with varying success. Constipation is probably the most common of all physical complaints.¹

In our minds, the best approach to the problem has always been to determine first the type of constipation the patient has. Is it caused by lack of sufficient roughage, poor diet, emotional factors, poor habit training, spastic or irritable colon, or an atonic colon or rectal dyschezia (lack of an adequate rectocolonic reflex sufficiently strong to empty the colon of its contents)?

Many patients can be relieved of their constipation difficulties if the above factors are taken into consideration and they are properly treated by dietary adjustment, adequate water intake, emotional adjustment, and habit training. But what of the individual who cannot carry out or who does not respond to these measures?

Irritant or stimulant laxatives are not the answer, since they produce no permanent benefit and may even aggravate the condition. It is recognized that the empty bowel created by laxatives leads only to another episode of constipation.²

Bulk laxatives are often impractical because of the difficulties of administration, the large required water intake, and the bloating and "fullness" they often produce. The danger of impaction is, of course, an ever present hazard with these agents.

Mineral oil is not desirable because of possible interference with absorption of nutrients

and vitamins. Leakage of oil from the ano-rectum and excessive flatulence are unpleasant results of its use.

The recent introduction of dioctyl sodium sulfosuccinate (Doxinate) as a fecal softener offers a new, physiologic approach to some of the problems seen in the constipated patient. This new drug is neither laxative, bulk producer, nor lubricant. The effect is solely that of improved dispersion of immiscible fecal material. This effect occurs as a result of decreased surface tension in the intestinal tract. Because of our interest in this new approach, we undertook a study of its effects in several types of constipation. We have been most enthusiastic about the results obtained.

PRELIMINARY DATA

Physicochemical considerations. Dioctyl sodium sulfosuccinate is a stable complex molecule which is neither absorbed nor altered chemically in the intestinal tract. Its effect on the surface tension at an oil-water interface, however, is remarkable. For example, the surface tension at a mineral oil-water interface approximates 55 dynes per centimeter but when a concentration of 1 per cent of dioctyl sodium sulfosuccinate is present in the aqueous phase, the surface tension is reduced to less than 2 dynes per centimeter. Since surface tension is the principal force preventing homogenization of an oil-water mixture, it is evident that decreases in surface tension favor homogenization. The intestinal content is composed of fats, oils, solid and dissolved materials, and water. Obviously, any agent which lowers surface tension would promote homogenization of fecal material and could be expected to soften the fecal mass.

Physicochemical measurements show that concentrations of dioctyl sodium sulfosuccinate ranging from 0.01 to 1 per cent are highly effective in decreasing surface tension. An 0.01 per cent concentration reduces surface tension at an oil-water interface to about one-fourth the normal value; a 1 per cent solution results in a

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reduction to about one-quarter the normal. This property of dioctyl sodium sulfosuccinate is shared by some other chemicals and makes them useful as detergents. Although a number of such compounds are known, physicochemical measurements show that dioctyl sodium sulfosuccinate is the most effective of the group.

These theoretic considerations are of therapeutic importance. First, dioctyl sodium sulfosuccinate can be effective only when both fats (oils) and water are present. The diet in constipation, therefore, must provide both. Second, fecal softening can best be achieved if a concentration of dioctyl sodium sulfosuccinate of from 0.01 to 1 per cent can be maintained in the fecal mass.

Let us assume that the average "normal" adult individual has a bowel movement once in each twenty-four-hour period and that the fecal volume approximates 200 gm.⁷ To achieve the satisfactory minimum effective dioctyl sodium sulfosuccinate concentration of 0.01 per cent in this fecal mass, a daily dose of 20 mg. would be required. An increase to 200 mg. (0.1 per cent concentration) would provide near the maximum effectiveness. Less frequent bowel movements would not affect this rough approximation significantly, since two days' fecal accumulation in the lower colon would be balanced by two days' dosage, and so forth.

These considerations serve to establish a basis for proper dosage, although it must be recognized that individuals vary greatly from the "average." The lack of toxicity and freedom from side effects indicate that these theoretically effective concentrations of dioctyl sodium sulfosuccinate can easily be achieved in the fecal mass.

Toxicity. Evidence indicates that dioctyl sodium sulfosuccinate is not absorbed and is non-toxic even in very large doses.

Wilson and Dickinson³ reviewed the principal pharmacologic findings and concluded that there was little evidence of any significant toxicity from the administration of dioctyl sodium sulfosuccinate in animals. Murdock⁴ reports similar findings. It is of interest to note that even very large doses do not produce diarrhea.

Clinically, Gray and Reifstein⁸ administered doses of dioctyl sodium sulfosuccinate of as much as 3 gm. per day for periods up to sixty-six days in the experimental treatment of ulcerative colitis. No ill effects or toxic symptoms were noted.

Wilson and Dickinson³ used dioctyl sodium sulfosuccinate extensively over a twelve-year period. No signs of toxic effects were observed.

In some instances, doses as large as 50 mg. per kilogram of body weight were given to infants without evidence of distress. They concluded that "dioctyl sodium sulfosuccinate has wide usefulness in the treatment of constipation because a good therapeutic effect can be obtained without the danger of toxicity or decreasing effectiveness even when used regularly for indefinite periods of time."

Clinical. Investigations with dioctyl sodium sulfosuccinate in the treatment of constipation have so far been largely restricted to children^{3,5} and to immobilized patients.³ Our purpose was to further evaluate the use of this agent in several types of chronic constipation in adults. Such studies have, in fact, been suggested as most desirable.⁶

MATERIALS AND METHODS

We studied the effect of dioctyl sodium sulfosuccinate in 47 patients seen in our practice in coloproctology. Constipation was present in 32 adults and in 3 infants, aged 6 months to 2 years. All of the 32 adults represented "difficult" cases in that their constipation had not been corrected by the usual measures: namely, changes in diet, adequate water intake, and attempts to establish proper habit time.

The remaining 12 patients were postoperative rectal surgery cases in whom dioctyl sodium sulfosuccinate was used routinely to prevent constipation.

In those patients with existing constipation, the technic of study was as follows. A chart was made of their complaints before treatment, together with a record of the number of bowel movements weekly, shape and consistency of the stool, any abdominal or rectal discomfort, and previous types of laxatives or lubricants used.

The patients were then given dioctyl sodium sulfosuccinate in doses of 40 mg. daily, increasing the dose every second day to a maximum of 120 mg. if results were not satisfactory. Under this regimen we then recorded the type and frequency of their bowel movements, any side effects observed, and the length of time necessary for the drug to become effective.

RESULTS AND DISCUSSION

Spastic constipation. This group before treatment complained of only 2 to 3 bowel movements per week which were ball-shaped and hard. Daily doses of 40 to 120 mg. of dioctyl sodium sulfosuccinate were given to 24 such patients, and 18 noted very good results. Results were fair in 3 and poor in the 3 others. Those

with good results reported 1 or 2 soft stools daily with no abdominal or rectal discomfort. Those with fair results noted an increase of bowel movements from 2 or 3 per week to 4 or 5 per week but still noted some degree of abdominal discomfort and tenesmus. The following case reports are rather typical and may be of interest.

Patient R. L., a middle-aged female, averaged 3 bowel movements per week. Stools were hard and passage was accompanied by anal pain and tenesmus. Laxatives had not been used. A single 20-mg. capsule of dioctyl sodium sulfosuccinate daily did not increase the frequency of bowel movements, but the stools were soft from the next succeeding day onward and anal pain was relieved. After two weeks, dosage was increased to 60 mg. per day. Stools remained soft and movements averaged 2 a day. After another week, dosage was reduced to 20 mg. a day. On discharge, the patient was experiencing an average of 1 soft stool daily and was instructed to continue the drug as needed. We considered this an excellent result.

Patient M. S., a middle-aged male, had averaged 2 bowel movements a week over the past five years. Milk of magnesia and mineral oil had been used, but stools were small and hard and the patients complained of cramps and tenesmus. Dioctyl sodium sulfosuccinate was begun at a level of 40 mg. a day, and after three days a soft stool was passed once daily for several days. Medication was continued, but constipation again developed a week later. Dioctyl sodium sulfosuccinate dosage was increased to 80 mg. a day with prompt excellent results which have continued for several weeks. The patient was discharged with instructions to use dioctyl sodium sulfosuccinate as needed.

Rectal dyschezia. This group consisted of 4 patients who appeared to lack the reflex required to empty the descending and sigmoid colon of its contents. There was no evidence of a spastic or atonic colon.

The use of dioctyl sodium sulfosuccinate alone in these 4 patients did not produce satisfactory results even after two months of therapy, nor did the simultaneous administration of mineral oil appear to favorably influence the condition.

Accordingly, dioctyl sodium sulfosuccinate therapy was continued, and the patients were instructed to use a glycerin suppository each morning to re-educate the sluggish defecation reflex. Prompt satisfactory results were obtained with the desired daily soft stool. At this time, 2 of the group have been able to discontinue suppositories and now experience soft stools of normal frequency on dioctyl sodium sulfosuccinate alone. Of these patients, 1 had been constipated for many years and had been using enemas frequently. Use of glycerin suppositories for approximately three weeks was required to re-educate the defecation reflex. The other patient had a long history of constipation and had used all types of laxatives. About a period of six weeks was necessary in order to permit the

re-appearance of the normal defecation reflex.

Children and infants. This group consisted of 3 children, aged 6 months, 1 year, and 2 years, respectively. All had been having hard scybalous stools which caused pain on evacuation plus anal fissures and bleeding. Good results were noted in all 3 with the use of dioctyl sodium sulfosuccinate given as a 1 per cent solution in doses of 2 cc. three times a day mixed with their formula or in fruit juice. Results were similar to those reported previously.^{3,5}

Miscellaneous. One patient with thrombotic external hemorrhoids and associated painful evacuation was given 40 mg. daily of dioctyl sodium sulfosuccinate and thereafter had soft bowel movements with little discomfort.

Three patients who had noted rectal bleeding and in whom anal soreness accompanied hard bowel movements were given dioctyl sodium sulfosuccinate. All stated that their soft stools no longer produced bleeding or soreness.

Postoperative group. We have always advised mineral oil for routine postoperative use in our rectal surgery to allow a soft stool to be evacuated. However, frequent leakage of oil, frequent bowel movements, and excessive flatulence have proved to be real disadvantages.

Of 12 cases treated with dioctyl sodium sulfosuccinate subsequent to rectal surgery, 9 had 1 or 2 soft stools daily with little distress and no side effects.

Of this group, 2 had a history of previous spastic constipation, and both experienced good results with the drug. Dosage of 40 to 80 mg. proved adequate.

In the remaining patients, dosage proved to be an important factor. Doses of 40 mg. or 60 mg. did not prove effective in the majority of patients, but 80 mg. per day was satisfactory in several patients who had not responded to 40 mg. doses. In 1 case, 120 mg. was necessary to achieve satisfactory results. In another interesting case, in which 80-mg. doses produced no response, 40 mg. per day was effective when given with 1 teaspoonful of mineral oil.

Results were poor in 3 patients even with doses of 80 to 100 mg. per day.

CONCLUSIONS

A new drug, dioctyl sodium sulfosuccinate, was studied clinically in a coloproctologic practice to determine its efficacy in cases of constipation as well as rectal disorders and postoperative cases.

In this small series of cases, we have been impressed with the good results that were obtained with this agent in approximately 80 per cent of

the cases of constipation and postoperative cases.

We noted no side effects, reactions, or toxicity. The softening effect of the drug on the stool was apparent on the average in forty-eight hours. After several weeks, many of the patients could stop taking the medication and continue to have good habit time.

Dosage seems to be an important factor. In our experience, 40 mg. per day is the minimum effective dose, and 60 mg. may be preferable in many cases of ordinary constipation. Postoperatively, 80 to 120 mg. is preferred for several days, and then usually the dose can be reduced to 60 or even 40 mg. per day. Since neither toxicity nor side effects are a factor, the larger dosages are preferable in the beginning and then reduced as indicated by the patient's response.

Although not a panacea for constipation, this drug certainly seems to be a better answer to

this problem than do any of the therapeutic agents previously available. The problems caused by irritating and deleterious effects of laxatives are avoided, such as habitual use and cramps. It is superior to lubricants both because it does not cause vitamin nor nutritional deficiency and because "leakage" and flatulence are absent. The drug is more convenient to administer than are the bulk laxatives, and the possibility of obstipation or obstruction which is inherent in these latter agents, is eliminated.

We believe that dioctyl sodium sulfosuccinate represents a very considerable advance in the prevention and treatment of constipation. Essentially, the agent is a simple aid to the normal body physiology.

Dioctyl sodium sulfosuccinate was supplied as Doxinate through courtesy of Lloyd Brothers, Inc., Cincinnati, Ohio.

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CHRONIC INFECTIONS of the urinary tract may be treated effectively with cycloserine (Seromycin). Russell D. Herrold, M.D., Arthur V. Boand, M.D., and Maurice Kamp, M.D., University of Illinois, Chicago, recommend that 1 gm. of the drug be given in divided doses every day for ten to fourteen days. Since the agent is bacteriostatic, symptomatic and bacteriologic improvement may be delayed.

Of 49 patients with bladder and upper urinary tract infections, 54 per cent were benefited by Seromycin therapy; 66 per cent of 19 patients with prostatitis and lower tract infections were improved. In many instances, the infections had been intractable to treatment with other antibiotics. Seromycin is generally ineffective against gonococcal infections.

Side effects include occasional nausea, vertigo, drowsiness, lightheadedness, and ocular disturbances. In most instances, treatment can be continued with lowered dosages. Slight side effects tend to lessen and disappear during therapy.

Since resistance to Seromycin does not develop quickly, the antibiotic is useful for long-term therapy and may be combined with other agents.

RUSSELL D. HERROLD, ARTHUR V. BOAND, and MAURICE KAMP: *Antibiotic Med.* 1:665-668, 1955.

Duodenal Ulcer in a 5-Month Old Infant

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PEPTIC ULCER is a common disease in children. Since the first case reported in 1829,¹ over 600 cases² have been reported in the literature, including 45 cases of chronic gastric ulcers³ and 32 cases of chronic duodenal ulcers.⁴ There have been 29 case reports in which there was a spontaneous rupture of the stomach⁵ in the newborn. Since 1949, I have seen 30 children with peptic ulcers. These cases were diagnosed either radiologically or post mortem.

The purpose of this report is to present the case of a duodenal ulcer in a 5-month-old child and to emphasize that peptic ulcers may occur at any age.

C. M. was born at term on July 4, 1954. His birth weight was 5 lb. and 10 oz. The prenatal history was normal. His neonatal course was complicated principally by continual spitting of his formula. His stools seemed normal. He seemed pale to his mother. He was never given vitamins. His immunizations were not started. He was taking milk, cereal, and vegetables, but milk was his main diet.

He was first seen on December 19, 1954. At this time, he was a well-nourished, active, pale child. There were no petechiae or ecchymoses on the skin. There was no general glandular enlargement. The head was normal. The eyes, ears, nose, and throat were normal. The heart and lungs were clear. The liver, spleen, and kidneys were not palpable. The umbilicus was normal. The genitalia were normal. The anal area was normal. The extremities seemed normal. All his reflexes were equal.

Accessory clinical findings. Temperature was 100.8 rectally and weight 14½ lb. Hemoglobin was 2.7 gm., white blood count 14,900, with polymorphonuclears 48 per cent and lymphocytes 51 per cent. The peripheral

smear showed hyperchromia and anisocytosis. No blast forms were seen and the platelets were adequate. Roentgenograms of the chest, long bones, and abdomen were negative. Throat culture grew out a hemolytic streptococcus sensitive to Chloromycetin and Aureomycin. His blood group was 2 A Rh positive. The urine was normal. The tuberculin test was normal. A stool was negative for occult blood on December 23 and 24, and stools were positive for occult blood by the guaiac test on December 24, 25, and 26. Roentgenogram of the stomach and small bowel on December 23 showed a definite ulcer crater situated in the superior distal portion of the duodenum.

He was transfused with whole blood on December 19 and 21. On December 27, the hemoglobin was 14.5 gm. He was discharged from the hospital on December 30. At this time, he was alert and happy and was taking his feedings well. He was to be given milk, fruit, vegetables, strained beef, 10 drops of Zymadrops, 1 tsp. of Feosol Elixir daily, 1 tsp. of Bentyl syrup three times a day after meals, and ½ an Alket tablet three times a day after meals.

He was next seen on April 1, 1955. At this time, the temperature was 99.8 rectally, weight was 19 lb. and 3 oz. The hemoglobin was 11.9 gm. Roentgenogram of the stomach and duodenum showed no definite ulcer crater.

He has not returned for more examinations and can be presumed to have no more trouble.

CONCLUSIONS

Peptic ulcers are being diagnosed with increasing frequency during the first two years of life. The case just presented further emphasizes the fact that vomiting in early infancy may be caused by a gastrointestinal ulcer amenable to medical treatment.

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Avian Tuberculosis in Man

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OUR KNOWLEDGE of tuberculosis begins with the evidence offered by Robert Koch,¹ in 1882, of an a priori relationship between the tubercle bacillus and mammalian tuberculosis. Rivolta,² in 1889, demonstrated a difference between human and avian tubercle bacilli. Among the first to observe and study tuberculosis in chickens was Crisp of England. In 1869, he reported seeing macroscopic tubercles in the livers, spleens, and along the peritoneal surface of the intestines in chickens dying of chronic wasting disease.³

The avian tubercle bacillus can be differentiated from bovine and human bacilli in a variety of ways.⁴ Its cultural characteristics are significantly distinctive on both solid and liquid media, its optimal growth temperature is higher, and its miscibility in fluids and resistance to acid is greater than either the bovine or human bacillus. Its chemical makeup is unique as are certain of its antigens. When experimentally introduced into an animal, a sensitivity is produced which is best elicited by intradermal injection of homologous tuberculin. Tests for pathogenicity are probably the best adapted means of establishing the identity of tubercle bacilli from cases of tuberculosis. The chicken is singularly susceptible to intravenous injections of avian tubercle bacilli, and this fact forms the basis for the most important single test used to establish a diagnosis.

Experiments have shown that numerous lower animals can be infected with the avian tubercle bacillus,⁴ but naturally occurring infections are found among domesticated fowl and more especially among chickens. Swine are next in order of frequency. In past years, much attention was given to the possibility of avian infection in cattle. The problem of cattle that reacted to mammalian tuberculin, yet had no visible lesions at necropsy, became more significant as the tuberculosis eradication program progressed.⁵ Superficial infections with saprophytic acid-fast bacteria as well as occasional avian and John's

bacillus infections were ultimately found to be the cause of such nonspecific reactions.

Cases of human infections caused by the avian tubercle bacillus (*Mycobacterium tuberculosis avium*) have been reviewed by Branch⁶ in 1931 and again by Feldman⁴ in 1938. In reviewing the world's literature up to 1938, Feldman found 13 cases that were sufficiently documented to warrant acceptance as authentic cases of human avian infection. "The isolation, direct from the tissues of the subject, of an acid-fast bacillus with the accepted cultural, antigenic and pathogenic characteristics of the avian tubercle bacillus and/or the isolation of a proved avian tubercle bacillus from the tissues of a laboratory animal previously inoculated with material from the subject, the laboratory animal to be free from all suspicion of spontaneous or accidental tuberculosis infection" was regarded as essential to the establishment of a diagnosis of avian tuberculosis.⁴ DeBlasio⁷ reported a case in 1932 which was not included among Feldman's cases and yet seemed to fulfill the aforementioned requirements. Bradbury and Young⁸ reported the first case known to have occurred in England in 1946, and Dragsted,⁹ in 1949, reported 6 cases that had been found in Denmark since 1935. The first case known to have occurred in the United States was published by Feldman and associates¹⁰ in 1949. The infection occurred in a female infant in Minnesota. The most recently published case was that of Karlson and associates¹¹ in 1955.

The clinical picture in these cases of avian infection is variable. In general, the symptoms, findings, and course are very similar to the condition that occurs if mammalian tubercle bacilli are implicated, with the exception of the fact that a greater percentage of cases have extra-thoracic involvement. The incidence is equal in both sexes. In the period from infancy to 21 years of age, 14 cases occurred and 3 of these were in infants. The youngest patient was a 14-month-old male infant and the oldest, a 59-year-old man. In 11 of the patients, pulmonary pathology was present and in 7, peripheral lymph nodes (cervical, submaxillary, and axillary) were involved. Of the patients with ad-

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enitis, 6 were female. Skin lesions were the presenting symptoms in 4 patients, of whom 3 were male and 1 female; 2 patients had generalized tuberculosis; 1 had meningitis; and renal tuberculosis occurred in 2.

The symptomatology is dependent in most cases upon the site of the primary lesion. Early writers stressed the high incidence of bone marrow, skin, kidney, and lymph node involvement in avian infection. Avian tubercle bacilli have reportedly been isolated from patients with polycythemia¹² and myelogenous leukemia,¹³ but such claims have not been confirmed.¹⁴ L'Esperance¹⁵ reported having isolated avian tubercle bacilli from several cases of Hodgkin's disease, but subsequent investigators have been unable to corroborate her findings.¹⁶ In patients with pulmonary involvement, symptoms of acute upper respiratory disease usually usher in a more chronic and debilitating process. Weight loss, malaise, night sweats, and hemoptysis are commonly observed among these patients. In cases of adenitis and skin involvement, a protracted course is the usual finding. A patient with adenitis was first studied at the age of 15,⁴ at which time an enlarged lymph node was noted in the right axilla. This node was removed thirteen years later. By the age of 45, another enlarged node appeared at the same site and bilateral apical disease was present. Similarly, a patient with skin involvement first noted the lesion twenty-eight years prior to the diagnosis of avian infection.⁷ The case of Karlson and associates occurred in a man 59 years of age who had chronic pulmonary fibrosis. Examination of pulmonary tissue with polarized light revealed many collections of birefringent crystals resembling silica. A diagnosis of silicosis with cor pulmonale was made, but the presence of avian tubercle bacilli in the sputum and gastric washings was not interpreted to have contributed to the development of pulmonary fibrosis. Avirulent tubercle bacilli have been shown to proliferate in experimental silicosis in guinea pigs but fail to become established in unaffected animals.^{17,18} However, studies have also shown that healed primary tubercles in the lungs can be reactivated by inhalation of quartz, granite, and carborundum dusts.¹⁹

The diagnosis of avian tuberculosis is based upon the isolation from the host's tissues of acid-fast bacilli that are comparable to the organism that is generally accepted as representative of *Mycobacterium tuberculosis avium*. Such a diagnosis can be accomplished by either making an initial culture or by directly inoculating material from the host into experimental ani-

mals. In the final analysis, the tests for pathogenicity are the most decisive for a diagnosis. The guinea pig, chicken, and rabbit are the animals used in pathogenicity tests. Avian tubercle bacilli injected subcutaneously into the guinea pig causes a local inflammatory response that may involve the regional lymph nodes but does not produce progressive disease as do mammalian type bacilli. The individual response among guinea pigs varies somewhat, but, even if death ensues, the picture is more of a toxic-type death, and subsequent inoculation of the same strain into other guinea pigs reveals its essentially nonpathogenic nature. Intravenous inoculation of chickens and rabbits produces a profound septicemic type of infection. The animals usually succumb in four to six weeks from a Yersin-type tuberculosis. The use of serologic methods for the diagnosis of human avian infection is not practicable because of the low degree of specificity of most procedures. Avian tuberculin has limited usefulness in diagnosis. When used in an experimentally infected animal, the results must be interpreted in the light of the fact that numerous acid-fast bacilli have been shown to be capable of sensitizing the guinea pig to avian tuberculin.²⁰ It has been established that only when an individual reacts maximally to avian tuberculin can significance be attached to the results in human infection.⁴

In recent years, considerable work has been done in an effort to understand better the tuberculin test in general and, specifically, to shed some light upon the problem of nonspecific reactions in humans to mammalian tuberculin. In reporting the results of mass testing with human and avian tuberculin, sponsored by the World Health Organization, Palmer and Edwards²¹ concluded that individuals with high-grade sensitivity, that is, those who reacted to weak doses of human tuberculin can be regarded as having specific sensitivity, the kind caused by infection with virulent tubercle bacilli, whereas those with a low-grade sensitivity appear to have been sensitized by a different agent. Those with the low-grade or nonspecific type sensitivity are detected more effectively with avian tuberculin than with human tuberculin. Hence, though the true nature of the sensitizing agent is unknown, it appears more closely related antigenically to the avian than to the human tuberculin. Therefore, in evaluating the role played by the avian tubercle bacillus in human disease, its relationship to the development in man of nonspecific sensitivity to human tuberculin must be considered as well as its part as a primary or secondary invader.

Most of the cases of human infection with the avian tubercle bacillus have been reported from western Europe, 1 case from England, and 2 cases from the United States. Although avian infection in man is not known to be a major problem, it is interesting to note that most of the cases have been reported from areas in which avian infection is common in the poultry population. Karlson and associates¹¹ state that their patient was from a rural community in a section of the United States in which tuberculosis among chickens is most prevalent. Feldman's case⁴ is likewise from such an area. The incidence of tuberculosis among chickens is greatest in the north central portion of the United States, but the specific dimensions of the avian reservoir remain undefined.

The mode of infection in man is unknown. From a study of the case histories, direct contact with infected chickens and handling of their

eggs as well as the ingestion of raw or insufficiently cooked eggs seem to be the source of infection in some instances. European investigators have reported that from 0.3 to 3 per cent of eggs sampled at random from supplies available to the public are contaminated with avian tubercle bacillus.^{22,23} However, Fitch and Lubbehusen,²⁴ in this country, state that less than 1 per cent of tuberculous hens lay infected eggs.

Although the course of avian tuberculosis in man is not unlike that caused by mammalian bacilli, the avian organisms are much more resistant to antibiotics. In conducting in vitro sensitivity tests on one strain, Karlson and associates¹¹ found the organism resistant to 10 μ g. of streptomycin, to more than 10 μ g. of para-aminosalicylic acid, and to more than 40 μ g. of isoniazid per milliliter respectively. These results are in keeping with the known resistance of the avian bacillus to antibiotics.

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A Tuberculin Testing Program in a Rural Wisconsin County

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Stevens Point and Wisconsin Rapids, Wisconsin

IN 1953, a program of tuberculin testing was initiated and organized by the office of the Wood County public health nurse and carried on with the approval and aid of the Wood County Medical Society. Vollmer's patch test was used. The staff realized the shortcomings of this test but felt that the advantages outweighed the disadvantages. The patch was applied, using the accepted technic and safeguards; the important part of the technic consisted of thoroughly cleansing the skin with acetone before applying the patch.

When the testing began, it was decided to test all school children from kindergarten through high school, including any preschool children and adults who cared to take advantage of the program. Very few adults appeared. Inasmuch as the majority of schools were small, no advantage could be gained by testing only certain grades; the entire school could be tested just as easily. This program was initiated as a case-finding project and not as a barometer for index of infection.

In 1953, 5,321 tests were applied, which constituted 95 per cent of the school children. In 1954, 4,300 tests were applied, which amounted to 90 per cent of an eligible total. In 1955, 4,751 tests were applied, which constituted 93 per cent of the children. Out of the 5,321 tests applied the first year, 78 were reactors. Subsequently, 163 contacts of the positive reactors were examined by roentgenogram and/or tuberculin test.

The programs in 1954 and 1955 were similar, although the numbers were substantially smaller than in 1953. We are at a loss to explain why because fully as much effort was put into the programs as in the first year. Perhaps interest was greater in the first year because the program was new.

The first year was most interesting from the standpoint of results. In a family of 10 children,

2 siblings were found to be positive reactors. The entire family was then checked; the father had an active lesion in the left midlung, an 18-year-old daughter had a moderately advanced active lesion in the right upper lung, and a 13-year-old daughter had pleurisy with effusion. The daughter with the pleural effusion had had a negative Vollmer patch test, but an x-ray film of her chest was taken because of contact with the 2 siblings who were positive reactors. These 3 patients were admitted to River Pines Sanatorium where the follow-up roentgenograms had been made.

On admission to the sanatorium, a Mantoux test using 1:1000 old tuberculin was repeated on the 13-year-old, which resulted in a positive reaction. There was an interval of four weeks between the negative Vollmer patch test and the positive Mantoux test. Possibly the patient's allergy emerged in the interval, or this may have been the result of the difference in sensitivity between the tests. The period was slightly shorter between the roentgen examination in the River Pines outpatient department and patient's admission x-ray film. At the time this patient was admitted to the sanatorium, the pleural effusion had decreased substantially and specimens of pleural fluid could not be obtained for culture studies. On appropriate chemotherapy, all 3 of these patients did very well. The father's lesion did not completely resolve and a wedge resection was necessary. The lesion which was removed was found to be caseous. All of these patients are now well and have returned to normal activities of life.

In 1955, 4,751 patients were tuberculin tested. Of this number, 54 were positive reactors. The important point, however, is that of these 54 positive reactors, 26 were negative when tested in 1954. If we allow for a percentage of error in the test, we still have a sizable number of patients who became positive reactors sometime during the intervening year. This, of course, is extremely important and we are making every effort to follow these children and to check their contacts intensively. So far, 1 suspicious contact

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has been noted. However, because of lack of cooperation on the part of this patient's physician, complete information has not as yet been made available concerning the active status of this case.

This report makes no pretense of being complete, nor is it a statistical analysis of thousands of cases, although thousands of tests are involved. Our hope, however, is to stimulate tuberculin testing programs in elementary as well as in high-school groups, for we feel this is a most productive source for case finding provid-

ing that contacts of positive reactors can be followed.

We were amazed to find 26 negative reactors convert within a period of one year, which, of course, indicates a source of infection is present that we have not as yet uncovered. Let us hope that none of us will become complacent about tuberculosis in any given area and, above all, that we will not neglect the tuberculin test as a case-finding tool. It appears to us that a case of tuberculosis will not become a medical curiosity for some time.

BRONCHOLITHIASIS is a significant cause of pulmonary disease and may necessitate major surgery. Laurence K. Groves, M.D., and Donald B. Effler, M.D., Cleveland Clinic Foundation and the Frank E. Bunts Educational Institute, Cleveland, stress the importance of early recognition and treatment.

Calcified lymph nodes abutting the tracheobronchial tree may erode the wall and enter the lumen of an adjacent bronchus. The nodes become calcified during healing of chronic pulmonary suppuration. Incidence of calcifications in the lower respiratory tract is high but significant broncholithiasis is relatively infrequent.

Symptoms vary with location and degree of penetration of the broncholith. Peripheral calcifications may cause only recurrent hemoptysis. Small calcified lesions may be totally extruded into the bronchus and expectorated. Erosions in the major ramifications of the tracheobronchial tree first cause hemoptysis and harassing cough and then, as bronchial obstruction increases, wheezing respiration, localized obstructive emphysema, obstructive pneumonitis, bronchiectasis, and contraction of pulmonary parenchyma distal to the lesion.

Roentgenographically, prominent calcifications and, often, persistent pneumonitis are apparent, suggesting bronchogenic carcinoma. Emphysema, bronchiectasis, empyema, and cavitation may be seen. Broncholithiasis rarely simulates typical pulmonary tuberculosis. Diagnosis may be aided by bronchoscopic examination.

Resection of the involved portion of the bronchial tree is the best treatment when the stone threatens to destroy bronchial integrity. Lobectomy or bilobectomy is definitive, yet nondisabling, treatment; lesser resection is apt to be unsatisfactory.

LAURENCE K. GROVES, and DONALD B. EFFLER: *Am. Rev. Tuberc.* 73:19-30, 1956.



Walter J. Marcley, M.D.

*Pioneer in America's Campaign to
Eradicate Tuberculosis*

J. ARTHUR MYERS, M.D.

Minneapolis, Minnesota

WALTER J. MARCLEY saw and participated in the tuberculosis eradication movement in America almost from its beginning. Born at Franconia, Minnesota, in 1867, he received the degree of Doctor of Medicine from Boston University in 1895. Approximately a decade before, E. L. Trudeau had opened the Adirondack Cottage Sanitarium, later known as the Trudeau Sanatorium. Two years after Dr. Marcley graduated in medicine, the first municipal sanatorium in America was opened at Cincinnati, Ohio. The first state sanatorium was then being built at Rutland, Massachusetts, and when its doors were opened for patients in 1898, Dr. Marcley was its first superintendent and medical director.

When 195 physicians organized the National Tuberculosis Association in 1904, Dr. Marcley was among them. Since his death, only 9 of the founders of that organization remain.

As Minnesota prepared to open a state sanatorium, Dr. Marcley's services were sought, and he became its first superintendent and medical director in December 1907. Four years later, he resigned to open an office in Minneapolis for private practice in diseases of the chest. That year he and Miss Elizabeth Sprague, a public health nurse destined to contribute magnanimously to the tuberculosis control movement, opened the first evening clinic for tuberculous patients in Minnesota at the Minneapolis General Hospital. Also, in the same year, Dr. Marcley was appointed secretary of a tuberculosis committee created by the Minnesota State Board of Health. This committee was later known as the State Tuberculosis Commission.

In those years, there was a large number of advanced cases of tuberculosis in this city. In fact, in 1903, the Minneapolis City Hospital report stated that it could care only for cases too advanced to recover. A pavilion located away from the center of the city was needed for the care and treatment

of patients in the earlier stages of tuberculosis. The Hopewell Cottage, located in the suburbs, with a capacity for 20 patients was opened in 1907. Preference was given to incipient cases. In 1912, the Hopewell Hospital, a division of the Minneapolis City Hospital, and located on the same grounds as the cottage, was opened with beds for 117 patients. Dr. Marcley became head of this institution on a part-time basis and continued in that position until 1923, after which he remained as chief of a tuberculosis service of the outpatient department of the Minneapolis General Hospital until 1927.

The following statement appears in his last report on Hopewell Hospital: "In closing this report, I wish for the third time to recommend that the name of the hospital be changed. This institution should be called a sanatorium, not a hospital. It should have a name which does not suggest even in the slightest degree the antiquated idea that tuberculosis is not a curable disease." The name of the institution was changed to Parkview Sanatorium that year.

When Glen Lake Sanatorium was opened in January 1916, Dr. Marcley was appointed attending physician. In August 1917, he entered military service as contract surgeon in the army. He was physician of the Rockefeller Tuberculosis Commission in France in 1918 and chief physician of the American Red Cross Commission to Switzerland in 1919.

When he returned to private practice, he became medical director of Thomas Hospital, an institution for tuberculosis which had been operating since 1907. The same year he was appointed attending specialist in tuberculosis of the United States Veterans' Bureau. When the Veterans' Hospital was opened with a tuberculosis service in Minneapolis in 1927, Dr. Marcley was appointed chief of that service. He continued in that capacity until the retirement age of 70 in 1937. However, he had no

desire to retire from the field of tuberculosis. An old friend, Dr. A. T. Laird, superintendent of Nopening Sanatorium near Duluth, appointed him physician to that institution in October 1937. He then became chief of the outpatient department from 1938 to 1941, when he was again obliged to retire because of his age. He still was not through.

Dr. Albert J. Chesley, secretary and executive director, Minnesota Department of Health, had Dr. Marcley appointed consultant in tuberculosis in that organization. He served in that capacity until he was 86 years old, when he was made consultant emeritus and continued to fight tuberculosis almost to the day of his death, November 8, 1955.

Concerning Dr. Marcley's service, Dr. D. S. Fleming, director, Division of Disease Prevention and Control, Minnesota Department of Health, said, "He was a much beloved and respected individual in our organization all through the years."

Although he did excellent work from the time he became superintendent of the Massachusetts State Sanatorium at Rutland in 1898 to the time he retired as consultant in tuberculosis for the Minnesota Department of Health in 1954, it has been said that some of his best work was done between 1941 and 1954. During these latter years, he had become keenly interested in epidemiology of tuberculosis and his position with the State Department of Health gave him unusual opportunities in this field. He contacted a great many doctors throughout the state by telephone or correspondence as they reported cases of tuberculosis, always emphasizing finding the source of the case and determining to whom the new case had spread tubercle bacilli.

In addition to his fine activities in the National Tuberculosis Association, he also participated in the Minnesota Tuberculosis and Health Association, serving as president from 1913 to 1914. In 1954 this organization presented him with a plaque in recognition of his lifelong service in the fight against tuberculosis. For forty-four years he was an active or honorary member of the Hennepin County Tuberculosis Association, serving on practically all of its committees and as president from 1925 to 1927. Dr. Marcley helped to organize the Minnesota Trudeau Society in 1925 and was its second president from 1926 to 1927.

He was a favorite physician among the thousands of World War I veterans with whom he worked from 1923 to 1937. He was exceedingly sympathetic toward them and left no stone unturned in arranging for their medical care and general welfare.

He was favorably known and highly respected internationally.

On my arrival at Saranac Lake, New York, for

the Trudeau School of Tuberculosis in 1920 and upon registering with Dr. E. R. Baldwin, then dean of tuberculosis workers of the United States, Dr. Baldwin inquired about Dr. Marcley and spoke of him in most glowing terms.

He had a fine sense of humor. Upon submitting for his approval a brief sketch of his life and work, to be included in a book on the history of tuberculosis in Minnesota in 1947, he made only one change, which consisted of striking out a sentence to the effect that he was then 80 years old. In the margin he wrote, "You don't need tell everybody I am 80."

Like many other physicians, I am deeply indebted to Dr. Marcley for numerous kindnesses in the early 1920's, including recommendations for various part-time positions in tuberculosis work.

Dr. Alexander Josewich, who was associated with Dr. Marcley in private and public work for more than forty years, says: "Throughout sixty years of tuberculosis practice, Dr. Marcley devoted himself continuously to the application of scientific advances in his field. He was a zealous advocate of social service as applied to the care and treatment of his patients. He was highly regarded by his patients and associates. His efforts were endless in the quest of first class care of tuberculous patients. Suggestions of his younger associates were always well received and given close attention. Particularly in his last years, due to his inherent kindness and modesty, the relationship of his young associates became more intimate. He was a master of textual criticism. Due to his retiring nature, he never sought office nor praise. Not only was he a student of tuberculosis, but also a critical student of literature. His accomplishments have left a lasting imprint with his numerous patients and friends. He lived a life befitting a saint."

Dr. Marcley contributed significantly to the decline in tuberculosis. When, in 1907, he became superintendent of the Minnesota State Sanatorium, 2,039 persons were reported to have died from tuberculosis in this state—mortality rate 103.1 per 100,000. That year the population was 1,978,414. In 1911, the year he resigned from that position, 2,522 persons died from tuberculosis—mortality rate 119.7. In 1954, the year before he died, when the state's population was approaching 3,000,000, only 138 persons died from this disease—mortality rate 4.3 per 10,000. Probably no one now living has seen or will see and examine as many persons with clinical tuberculosis as Dr. Marcley.

The world's citizenry is fortunate that he was permitted to live so long and so effectively. It remains for those now living and those to follow to carry on until tuberculosis is eradicated.



This department of THE JOURNAL-LANCET is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

Hypertension and Unilateral Renal Disease

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Minneapolis, Minnesota

CASE REPORT

E. L., a 52-year-old white male, was admitted on April 12, 1952. Five weeks earlier, he noted the onset of exertional dyspnea and orthopnea as well as dependent and facial edema. Hypertension was noted for the first time. He had had no visual disturbances nor headaches. He was treated with a low-salt diet and mercurial diuretics. For the past five years, he had had intermittent abdominal pain associated with the ingestion of fatty foods and relieved by soda. At the age of 18, he had gonorrheal urethritis.

Physical examination revealed an alert, well-developed, well-nourished, cooperative individual. His blood pressure varied between 210/115 and 190/105. The right pupil was slightly larger than the left. Many fresh hemorrhages were present in the left retina and a few recent hemorrhages and arteriovenous nicking in the right retina. The heart was enlarged to the left. Numerous basal rales were heard in the lungs. The liver was palpable 3 fingerbreadths below the costal margin. Ascites and pitting edema of the lower extremities, hands, forearms, and sacral region were present. There was a generalized

discrete adenopathy; subsequent biopsy was reported as hyperplastic lymph node. Arterial pulsations of the lower extremities were normal. The prostate gland felt small and benign.

The peripheral blood was normal. The specific gravity of the urine was 1.011, the pH was 7, albumin was 1+, no sugar was present, and the sediment was negative. Urine culture was sterile. Blood urea nitrogen was 17 mg. per cent. The intravenous injection of benzodioxane failed to lower the blood pressure. The spinal fluid Wassermann was 4+; colloidal gold was negative. Electrocardiogram disclosed a wandering auricular pacemaker with occasional episodes of nonconducted auricular beats followed by a nodal escape beat. A roentgenogram of the chest revealed cardiac enlargement with pulmonary congestion and calcification of the ascending aorta. Excretory urogram disclosed a normally functioning hypertrophied right kidney and a small nonfunctioning left kidney (figure 1). Cystoscopic examination disclosed a small prostate gland and a fine trabeculation of the bladder. A left pyeloureterogram was interpreted as either renal hypoplasia or cicatricial pyelonephritis (figure 2). The residual urine was 5 cc. Retrograde catheterization of the femoral artery was unsuccessful. The venous phase of translumbar

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Fig. 1. Excretory urogram showing hypertrophied right kidney and nonfunctioning left kidney.

aortography disclosed a small left kidney; he breathed during the arterial phase. Roentgenograms of the gastrointestinal tract were negative.

After administration of digitalis, mercurial diuretics, and a low-salt diet, the edema disappeared and his blood pressure varied between 170/150 and 200/116.

The left kidney was removed; it weighed 95 gm. The pathologist reported chronic pyelonephritis, a slight amount of atherosclerosis of the renal artery, the lumen of which was pinpoint, and calcium deposits in the renal papillae. He was discharged on July 1, 1952.

During the two and one-half years after the left nephrectomy, no episodes of cardiac failure have occurred and the electrocardiogram has become normal. The retinal hemorrhages have disappeared. On September 13, 1953, a subtotal gastrectomy for benign gastric ulcer was performed. In February 1955, the blood pressure was 150/90, as determined on several occasions.

DISCUSSION

Various theories have been evolved to explain the role of the kidney in the production of hypertension. Many believe that the ischemic kidney produces renin, a proteolytic enzyme, which reacts with hypertensinogen circulating in the blood to release angiotonin, an active pressor

polypeptide. However, in the dog, the hypertension persists in spite of the disappearance of renin from the blood. Others think the ischemic kidney fails to destroy an already existing pressor substance in the blood. Another theory is that the ischemic kidney does not produce the normal supply of humoral agents. Obviously, there is no uniform explanation concerning the mechanism whereby hypertension is produced in the laboratory animal. Moreover, hypertension in human beings is most difficult to interpret in the light of the findings in the laboratory.

Various renal lesions have been incriminated in the production of hypertension. Acute renal infections usually are not associated with elevation of the blood pressure, whereas chronic renal infections may be. Atrophic pyelonephritis is the commonest unilateral lesion capable of producing hypertension which, however, has been relieved by nephrectomy for tumor, lithiasis, tuberculosis, hydronephrosis, and vascular lesions of the renal artery. History is a poor indication of the duration of the hypertension. There is no correlation between duration of urinary tract disease and the severity of the elevation of blood pressure.

Every hypertensive patient 50 years of age or less should have an excretory urogram. Unfortunately, it is not possible to predict during the



Fig. 2. Left retrograde pyelogram showing renal hypoplasia or cicatricial pyelonephritis.

preoperative examination whether or not nephrectomy will be followed by a good result. There is no characteristic clinical picture of hypertension secondary to unilateral renal disease. Some feel that, whenever unilateral renal disease is the cause of hypertension, a severe and accelerated hypertension of less than four years' duration is present associated with retinitis; however, retinal findings may be absent in the very young. Others say that excess of renin may produce a syndrome similar to diabetes insipidus, the polyuria being directly attributed to the renin and not to the diseased kidney or retention of nitrogenous wastes. The roentgenographic differentiation of atrophic pyelonephritis and renal hypoplasia is most difficult.

Some patients may be symptomatically improved after nephrectomy even though the blood pressure does not revert to normal levels. In a very high percentage of successful cases, retinal vascular changes are reversible, and the papilledema, exudate, and hemorrhage may disappear.

An improper selection of patients accounts for the low percentage of "cures" of renal hypertension. Nephrectomy in the presence of hypertension should never be considered unless (1) there is a surgical indication for the removal of the diseased kidney; (2) the kidney is nonfunctioning or poorly functioning; (3) the contra-

lateral kidney is hypertrophied and capable of sustaining life as determined by excretory urogram, phenolsulfonphthalein studies, and bacteriologic examination; (4) the hypertension has been present on several blood pressure determinations; (5) the elevated blood pressure is of less than two years' duration, otherwise, arteriosclerotic and arteriolosclerotic changes may have occurred in the so-called normal kidney; (6) no secondary irreversible hypertensive changes are present in other organs; and (7) there are no unrelated serious lesions of other organs which, in themselves, may be considered inoperable. Hypertensive retinopathy is no contraindication to nephrectomy. Even if the above criteria are met, a favorable result is not a certainty.

The urinary tract should be visualized by an excretory urogram, cystoscopic examination, and retrograde pyelogram if the former is inconclusive. Phenolsulfonphthalein excretion of each kidney should be determined. A urinalysis and bacteriologic examination of specimens from both kidneys are necessities. Translumbar aortography has proved to be a valuable aid in depicting lesions of the renal pedicle.

The prognosis is best in individuals under the age of 40 and especially in the very young. It is poor in hypertension of long duration because of the arteriosclerotic and arteriolosclerotic changes in the contralateral kidney.

PROSTATECTOMY is justified in patients with some forms of cardiac disease if urinary tract symptoms are disabling. However, prostatectomy should not be done if the patient has severe insufficiency at rest which is not benefited by digitalis and diuretics or has had recent coronary occlusion.

Although prostatectomy is about 3 times as risky in patients with various forms of myocardial insufficiency as in noncardiac patients, Mogens Iversen, M.D., Søren Jørgensen, M.D., and Olaf Povlsen, M.D., Bispebjerg Hospital, Copenhagen, find that difficulties arise primarily in the postoperative period and not during surgery. Patients with heart disease, obesity, and hypertension usually do not survive postoperative hemorrhage, ileus, phlebothrombosis, pulmonary embolism, pneumonia, or atelectasis, which may occur in any group of surgical patients. Barring such complications, some cardiac symptoms are relieved by prostatectomy, since the patient no longer experiences frequent painful nocturia. Therefore, prevention of postoperative complications will greatly decrease the risk for patients with heart disease.

MORGES IVERSEN, SØREN JØRGENSEN, and OLAF POVLSSEN: *J. Urol.* 73:1075-1080, 1955.



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American College Health Association News . . .

The Michigan College Health Association held a three-day meeting at East Lansing at the Kellogg Center April 5 to 7, 1956. Officers for the coming year elected at this conference are as follows:

President, Mr. Ward Preston, dean of men, Jackson Junior College, Jackson; president-elect, Mr. Vernon E. Keye, Student Health Service, Wayne University, Detroit; secretary-treasurer, Mrs. James Kelly, Health Center, Jackson Junior College, Jackson.

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Representatives from 15 medical centers throughout the country held a workshop on employee-student health services March 27 and 28, 1956, at the University of Oklahoma Medical Center to pool information on methods.

Dr. Jean Felton, head of Personnel Health Services at the Oklahoma Medical Center directed the meeting. Topics on the agenda include: combating fatigue in student nurses and doctors, providing immunity from contagious diseases for employees, and regular physical check-ups.

Irvin W. Sander, M.D., secretary-treasurer of the American College Health Association and director of the health service at Wayne University, Detroit, attended the workshop as did Frank R. Smith, Jr., M.D., council member of the association and director of the Health Service, Johns Hopkins University, Baltimore.

Dr. William M. Brace died at the University Hospital, Ann Arbor, Michigan, on April 23, 1956. He had been ill for a number of months.

Dr. Brace was born in Detroit and was a graduate of the Medical College of the University of Michigan in 1923. After internship in Baltimore, he returned to Ann Arbor and the Department of Internal Medicine at University Hospital. In 1928, he became a physician at the University Health Service under Dr. Forsythe, where, in 1940, he was placed in charge of Medical Service for men. He continued in this post until his death.

During his years as health service physician, Dr. Brace took part professionally and socially in many activities of the Ann Arbor campus. He was an exceptionally able person and was most popular with both his colleagues and students. His loss to the University of Michigan will be greatly felt by his many friends.

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Notice has been received of the retirement of Dr. Orville Rogers as director of the Health Service at Yale University. Dr. John S. Hathaway is his replacement.

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Roxie A. Weber, M.D., director of the College Health Service, Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma, states that they are in need of another physician, either man or woman. Anyone interested should write to Dr. Weber for information.

Experimental Tuberculosis, Bacillus and Host - Addendum on Experimental Leprosy, Ciba Foundation symposium, edited by G. E. W. WOLSTENHOLME, and MARGARET P. CAMERON, 1955. Boston: Little, Brown & Co., 396 pages. \$9.00.

This book of 396 pages contains the transactions of a symposium presented October 5 to 7, 1954. It is one of many international symposia arranged by the Ciba Foundation. The participants were invited from various nations, and the symposium was conducted under the chairmanship of Dr. Arnold R. Rich, Johns Hopkins University. The book contains each speaker's presentation and the discussion. Those participating consisted of bacteriologists, chemists, immunologists, pathologists, and tissue culture experts. As the name indicates, the volume contains nothing pertaining to treatment, diagnosis, nor other clinical aspects of tuberculosis but is entirely devoted to experiments on the bacillus and host. The following are a few of the many titles of papers:

1. The proteins of the tubercle bacillus.
2. Polysaccharide components of the tubercle bacillus.
3. Granuloma-producing properties of synthetic fatty acids.



4. Early tissue reactions to tubercle bacilli and their products.

5. Biochemical factors which may influence the fate of tubercle bacilli in tissues.

6. Tuberculous hypersensitivity and desensitization.

The volume also contains an addendum on Experimental Leprosy.

This book will be of interest to all persons working in the field of tuberculosis and of especial value to those engaged in various experimental studies.

J. A. MYERS, M.D.

•
Psychotherapeutic Intervention in Schizophrenia, by LEWIS B. HILL, M.D., 1955. Chicago: University of Chicago Press. 216 pages. \$5.00.

This easily read book by Dr. Hill represents to this reviewer a mile-

stone in the understanding and psychoanalytic psychotherapy of the schizophrenic patient comparable to Eugen Bleuler's *Dementia Praecox* in 1911.

Starting with a brief but important chapter "On Becoming a Psychotherapist," the author devotes lucid chapters to defining "What Is Schizophrenia" and "Acute Schizophrenia - the Experience and the Treatment." He then moves into the roots of his work and of the schizophrenics' way of life so that he is bent "On Being a Person Prone to Schizophrenic Episodes." Delving more deeply and analytically into this way of life, Dr. Hill devotes 32 pages to a review of our present knowledge "On Infancy - the Period of Becoming a Person" so that the reader and therapist may then be able to differentiate between healthy, unhealthy, and schizophrenic development. Chapters follow on "The Mothers of Schizophrenics" and "On the Infancy of the Potential Schizophrenic."

Dr. Hill writes poetically and at times with a touch of light humor. He states "psychotherapy is a form of artistic creation," "the psychiatrist is an artist who works with a living medium towards creative

(Continued on page 30A)

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BOOK REVIEWS

(Continued from page 28A)

ends." Although an artist, the therapist is not excused from also being a scientist who must learn what is relevant in biology, physiology, pathology, psychology, and psychopathology as well as in sociology, anthropology, and the humanities in general. The book ends with separate chapters on the patient's and the therapist's contribution to psychotherapy.

In his chapters "On Infancy—the Period of Becoming a Person" and "On the Infancy of the Potential Schizophrenic," Dr. Hill's theory is that the schizophrenic's way of functioning begins before the age of four months. He believes that the predisposition or the readiness to become schizophrenic or depressive may be to a degree inborn.

The child of aggressive female ancestors and effeminate male ancestors will have difficulties centering around active aggressiveness and passive submissiveness. If the child is unstable in his balance of activity and passivity, his overt behavior is apt to be passive, whereas his active behavior will be noted in the form of negativism, stubbornness, and retentiveness.

These potentially schizophrenic infants are victims of a lively readiness to be anxious and tend to be hypersensitive to danger or imagined danger. Dr. Hill thinks this may be due to a constitutional factor. Rather than fight, the technic they employ is flight, quiet passive withdrawal, somnolence, and inattention. Being somewhat precocious intellectually, they begin early, while still in the stage of magical thinking, to use ego functions for the defenses against anxiety. There is a massive impact made upon the child in his earliest experience of another human being—of the mother's underlying and pervasive anxiety, her feeling of guilt, her suspicion of people, and avoidance of immediate intimacy.

In his chapter on the mothers of schizophrenics, Dr. Hill rather sympathetically reviews the neuropathic backgrounds and early life of these mothers to explain the dynamics resulting in their frequent schizophrenogenic drive in the rearing of one child while the remaining siblings usually grow up without such serious sequelae. He reviews the basis for the frequent rage and anger reactions in therapists toward these mothers who have dispossessed their child of his own bodily and mental integrity and emphasizes the value

of the psychiatrists' encouraging such mothers to seek psychotherapy.

Mothers of schizophrenics as well as their own mothers frequently idealized motherhood with desperate devotion, and usually ruled their homes either directly or more often indirectly through their tears, suffering, and other hurt technics to make children and husbands feel guilty. Disappointed in marriage, the schizophrenogenic mother invests her foredoomed child with magically perfect qualities to which she attaches an intense, possessive, idealistic, and demanding love. She is driven to keep the child always an infant, utterly dependent, and responsive and in need of her love.

My only criticism of this excellent book is that Dr. Hill explores too briefly the role of the fathers of schizophrenics, a relationship about which we all need to learn more. He does describe "female schizophrenics who are apparently involved more tragically with their fathers than with their mothers. Sometimes these fathers have tried to make men of their daughters; often they have tried to keep the daughters immature and have used them as sexual playthings. Some fathers resent being excluded from the morbidly symbiotic mother-son intimacy in their homes and retaliate by expressing contempt for the son's infantile helplessness and what the father experiences as the son's effeminacy.

Dr. Hill presents the evolution of the psychotherapist from his first psychiatric residency to the skilled, analytic psychotherapist. He presents the anxieties, frustrations, fears, blind spots, early use of power technics, needs to advise, direct, exhort and take over, in the transition from treating a diagnosed disease entity to the experience of helping sick persons whose minds are dysfunctioning to integrate and function in more or less greater accordance with reality. Psychotherapeutic intervention begins with the therapist's self awareness and capacity to feelingly understand the fragmented egg shell fragility of the schizophrenic's ego caused by an inherited and social background which denies opportunities for self realization.

The constructive philosophy of Dr. Hill, a past president of the American Psychoanalytical Association, pervades this book. In the treatment of schizophrenic patients, he takes a definite stand against the role of the detached, unfeeling "intellectual Freudian analyst" who

mostly listens. He also speaks out against the therapist's temptation to "do something rather than to be something in therapy" and delineates these processes clearly.

I highly recommend this book to all who treat or have professional contact with psychiatric patients.

MILTON MILES BERGER, M.D.

•
The Practical Nurse and Her Patient, by FERN A. GOULDING and HILDA M. TORROP, 1955. Philadelphia: J. B. Lippincott Co., 319 pages. \$4.25.

In their introductory statements, the authors explain that this book is written for all practical nurses and practical nurse students. Their intention is to supply supplementary information to help the nurse develop an understanding of the total needs of the patient and adapt nursing care to meet these needs in different situations. The actual steps of nursing care technics are presented only when necessary for clarification, for other texts are expected to be used for this information.

Much of this book seems to be directed to the care of the patient in the home, but most of the information deals with principles basic to meeting nursing care needs and is applicable in different situations. The authors place much emphasis on understanding the patient as a person and as a member of a family and a community. They stress the fact that the practical nurse is responsible for knowing how to perform a nursing technic safely and effectively before attempting it.

The book is divided into eight parts, each of which is introduced by a brief summary of the purpose and contents. Each part is then divided into chapters which begin with introductory paragraphs describing the responsibility of the practical nurse in the particular area of patient care. In each chapter under the subheading of "Important Points to Remember," the writers list factors that must be considered in adapting nursing care to meet the specific needs of the individual patient. At the end of each chapter is a list of suggested references.

Readable type and the way in which the material is arranged makes this book easy to read. The form of writing is clear and usually concise. Most chapters are short. There are several good illustrations. The table of contents and index make this an excellent reference book.

ELIZABETH DAVIDSON, R.N.

News Briefs . . .

North Dakota

DR. ANNE CARLSEN, superintendent of the Crippled Children's School, Jamestown, was recently presented with a citation for outstanding service by the Governor's Committee on Employment of the Physically Handicapped. The citation was awarded by Governor Norman Brundage at the annual meeting of the committee.

.

DR. HERBERT WILSON, New Town physician, has been elected president of the North Dakota Tuberculosis and Health Association.

.

DR. MARIANNE WALLIS, of Minot, has been elected president of the North Dakota Radiological Society. Other officers include: Dr. Marshall Landa, Fargo, vice president; Dr. Eric W. Walter, Bismarck, secretary; and Dr. H. Milton Berg, Bismarck, treasurer.

.

DR. FREDERICK L. BEHLING, specialist in orthopedic surgery, and DR. LAWRENCE SMITH, specialist in general and chest surgery, have joined the staff of the Dakota Clinic, Fargo. Both physicians recently completed a four-year fellowship at the Mayo Clinic, Rochester.

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DR. RAYMOND COULTRIP became associated with the Cooperstown Clinic in April. He continues to keep office hours in Sharon on Tuesday, Thursday, and Saturday mornings.

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DR. HAROLD PHELPS is the new community physician in Riverdale. He replaces Dr. George G. Edwards who has been called into military service.

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DR. F. D. PETERKIN, Langdon physician, will leave June 15 for four years of postgraduate study in obstetrics and gynecology at London, Ontario. Dr. Peterkin has been in partnership with Dr. Paul V. Adams since July 1953. He will be succeeded by Dr. Nicholas Kaluznick of Selkirk, Manitoba.

Minnesota

THE ALEXANDRIA CLINIC, organized in the fall of 1945, has moved into a new building. A spacious glass-enclosed waiting room, one of the most complete x-ray laboratories in the area, 18 examining rooms, minor surgery and fracture room, proctology room, and rooms for diathermy, electrocardiograms, and basal metabolism tests are some of the improvements of which the new clinic can boast. The staff now includes Drs. G. W. Clifford, L. F. Wasson, H. L. Stemsrud, C. E. Carlson, P. M. Geiser, D. W. Heegaard, and Douglass Perkins.

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THE UNIVERSITY OF MINNESOTA's board of regents recently acknowledged \$527,489 in research grants, scholarships, fellowships, awards, and gifts. The largest grant, in the amount of \$168,185, was received from the United States Public Health Service.

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THE MINNESOTA HEART ASSOCIATION has voted to enlarge its corporate membership from 77 to 200 to keep up with the organization's rapid growth as a fund-raising health agency. Funds are used to finance research in heart disease, education, and service programs in Minnesota.

(Continued on page 32A)

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NEWS BRIEFS

(Continued from page 31A)

DR. DONALD C. BALFOUR, director emeritus of the Mayo Foundation for Medical Education and Research and emeritus professor of surgery in the Graduate School of the Mayo Foundation, was a recent recipient of the Friedenwald Medal of the American Gastroenterological Association. The medal, honoring outstanding contributions to knowledge in the field of gastroenterology, is awarded one year to a physician, the next to a surgeon, and the third year to a research worker. Dr. Balfour was honored for his contributions to surgery.

DR. JOHN R. McDONALD, of the Mayo Clinic and Mayo Foundation, received the 1956 American Cancer Society Medal for Minnesota. Dr. McDonald is head of a section of surgical pathology and has conducted research in detecting cancer long before symptoms are present by studying cell structures.

DR. FRED WITTICH was recently designated president emeritus of the American College of Allergists. The action was in recognition of Dr. Wittich's founding of the college and his twelve years as secretary-treasurer.

DR. ROBERT L. PARKER, associate professor of medicine at the Mayo Foundation, has been named president of the Minnesota Heart Association. Dr. Parker was elected by the board of directors to head the group during the absence of Dr. James Cosgriff who is on vacation.

DR. SIDNEY HUGHES, of the Winona Clinic, has been certified as a specialist in internal medicine by the American Board of Internal Medicine.

DR. WESLEY W. SPINK, professor of medicine at the University of Minnesota, has been re-elected to a three-year term on the board of governors of the American College of Physicians.

DR. RENO W. BACKUS has been appointed superintendent and medical director of the Nopeming Sanatorium, succeeding Dr. G. A. Hedberg. Dr. Backus previously specialized in internal medicine and the treatment of tuberculosis at Hopkins Memorial Hospital, Peking, China. He joined the Glen Lake Sanatorium staff in 1942 and was appointed to the Nopeming staff in 1943.

DR. VINCENT RYDING has opened offices in the Mountain Lake Clinic. Formerly associated with the clinic in Albert Lea, Dr. Ryding has taken over the practice of Dr. P. J. Pankratz.

DR. HENRY A. THOMPSON has established practice at St. Peter in the St. Peter Clinic Building. A 1953 graduate of the University of Minnesota Medical School, Dr. Thompson practiced at Litchfield and Madelia the past year.

DR. R. E. POGUE, who has served the Watertown area for twenty-three years, is retiring from medical practice for reasons of health. Dr. J. W. Clarke, an associate of Dr. Pogue's for the past four years, will be in full charge of his practice.

DR. ROBERT D. PILGRIM has become the medical associate of Dr. S. W. Giere in Benson. The community is now served by 7 physicians.

DR. L. W. HANSON, who has been associated with Dr. H. A. Korda in Pelican Rapids for the past four years, has accepted a position as resident physician in the department of orthopedic surgery, Baylor University, Houston, Texas.

South Dakota

THE NEW CLINIC AT HILL CITY, South Dakota, representing five years of hard work on the part of residents of the community, was scene of an open house recently. The building includes a reception room, consultation room, x-ray dark room, and laboratory, as well as living quarters for Dr. Andrew Hesz and his family.

DR. CECIL G. BAKER has been appointed superintendent of the Yankton State Hospital. Dr. Baker has had considerable institutional psychiatric experience, serving as chief of neuropsychiatry at the Veterans Administration Hospital in Iowa City, assistant superintendent at the state hospital in Blackfoot, Idaho, and staff member of the Veterans Administration Mental Hospital, American Lake, Washington.

DR. PHIL J. WHITE has been appointed to the surgical staff of the Rapid City Medical Center. Dr. White's special training includes a year in pathology at Bellevue Hospital, New York City, a year and a half with the Veterans Administration Hospital, Denver, and eighteen months as army surgeon.

DR. MARK WILLIAMS, who has practiced in Conde since 1946, recently accepted a position on the staff of the Veterans Administration Hospital in Sioux Falls. A reception for 500 guests was among the many farewell social functions given in honor of Dr. Williams and his family prior to their departure.

Deaths . . .

DR. N. W. SCHUMACHER, 78, a physician at Hettinger, North Dakota, for many years, died suddenly March 22.

Dr. Schumacher began practice in Dent, Minnesota, in 1912. He moved to Hettinger in 1926, where he practiced until failing health forced his retirement in 1952.

DR. WILFRED E. BLATHERWICK, 85, who served Mountrail County, North Dakota, for most of his fifty-two years of practice, died early in April.

DR. W. H. CONDIT, 84, Minneapolis obstetrician, gynecologist, and surgeon, died April 21. Dr. Condit had been treasurer of the Minnesota State Medical Association since 1932 and was formerly vice president of the group. He had been a staff member of Northwestern, Doctors Memorial, and University hospitals and for years was a teaching assistant at the University of Minnesota Medical School.

DR. PAUL A. HIGBEE, 82, a Minneapolis physician for nearly fifty years, died March 29.

DR. JOSEPH A. LEBOWSKE, 75, honored a year ago by the Minnesota State Medical Association for his fifty years of service, died April 1. Dr. Lebowske was a life member of the Minnesota State Medical Association and Hennepin County Medical Society.

DR. SCOTT LARRABEE, 71, an eye, ear, nose, and throat specialist in St. Paul for thirty-three years, died April 2.

DR. EVERETT C. HARTLEY, 65, St. Paul gynecologist and obstetrician, died May 1 after a long illness. Dr. Hartley was an associate professor at the University of Minnesota Medical School and a member of the Chicago Obstetrics and Gynecology Society.

(Continued on page 35A)



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NEWS BRIEFS

(Continued from page 33A)

DR. FREDERICK W. VASENIUS, 82, city health officer in Chisholm, Minnesota for twenty years, died April 23. Dr. Vasenius gained countrywide recognition during a pneumonia epidemic in Africa. Upon his return to the United States in 1902, he settled in Chisholm.

• • • •

DR. MADGE HOLMAN, 79, who with her husband the late Dr. Carl J. Holman, practiced many years in Mankato, Minnesota, died April 19 in Los Angeles.

DR. F. W. PENHALL, 93, a pioneer physician of Morton, Minnesota, died April 1. Dr. Penhall served the residents of Morton for fifty-three years and then joined the Willmar State Hospital in answer to an emergency call. He returned to Morton in 1955 to retire.

• • • •

DR. HOMER M. MCINTIRE, 71, died at his home in Waseca, Minnesota, April 11. He was affiliated with Moore Hospital, Eveleth, Minnesota, for four years and was a surgeon at Steptoe Valley Hospital, Ely, Nevada, for one year before establishing practice in Waseca in 1919.

PAPER- AND STORAGE CEILINGS LIMIT SUPPLY OF JOURNAL-LANCETS

The print order of this journal each month no longer takes into account an over-liberal quantity of file copies. Moreover, we find ourselves limited in storage space. This means that in order to fulfill its purpose in supplying libraries and clinics desiring to complete volumes for binding it cannot fill requests for issues more than three months old. Because of this limitation subscribers are urged to make their back-issue and extra-copy requests promptly so that they will not be disappointed and that an equitable service may be rendered.



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- General Surgery, Two Weeks, September 10.
- Thoracic Surgery, One Week, October 1.
- Esophageal Surgery, One Week, September 24.
- Breast and Thyroid Surgery, One Week, October 22.
- Fractures and Traumatic Surgery, Two Weeks, October 15.

GYNECOLOGY AND OBSTETRICS—

- Obstetrics and Gynecology, Three Weeks, October 22.
- Office and Operative Gynecology, Two Weeks, September 17.
- Vaginal Approach to Pelvic Surgery One Week, September 10.

MEDICINE—

- Electrocardiography and Heart Disease, Two-Week Basic Course, July 9.
- Internal Medicine, Two Weeks, September 24.
- Gastroscopy and Gastroenterology, Two Weeks, September 10.
- Gastroenterology, Two Weeks, October 22.
- Dermatology, Two Weeks, October 15.

RADIOLOGY—

- Diagnostic X-Ray, Two Weeks, September 17.
- Clinical Uses of Radioisotopes, Two Weeks, October 8.

UROLOGY—Two-Week Course October 8. — Cystoscopy, Ten Days, by appointment.

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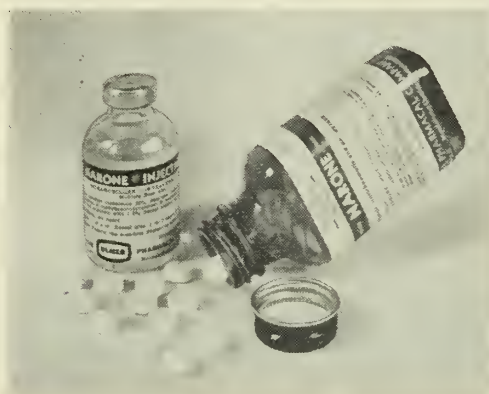


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*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- Inguinal herniorrhaphy demands great care and discrimination on the part of the surgeon. In the adult, the operation must be divided into two procedures. The first part deals with meticulous dissection of the entire operative field. The second part is devoted to well planned reconstruction of the inguinal wall. Both procedures are covered step by step in the paper "The Perennial Problem of Inguinal Hernia" by F. M. Al Akl, M.D., associate attending surgeon at Kings County Hospital, Brooklyn, New York. Operative technics are described in terms of surgical anatomy.

- "Emergency Care of the Patient with an Acutely Injured Head" by Ralph M. Stuck, M.D., clinical instructor in neurosurgery at the University of Colorado Medical Center, Denver, stresses the importance of proper management during the first twenty-four hours after injury. Care in handling the patient, relief of asphyxia, control of hemorrhage and shock, and treatment of fractures present the most urgent problems and are considered first. Attention is then directed to management of conditions that may arise to complicate convalescence, such as convulsions, coma, and cerebral edema.

- Since no treatment is known which will cure leukemia, arrest of the progress of the disease and palliation of symptoms are the aims of therapy today. "Modern Concepts in the Treatment of Leukemia" by Willis M. Fowler, M.D., and William P. Jolly, M.D., of the department of internal medicine, State University of Iowa Hospitals, Iowa City, evaluates many of the agents used to combat various forms of this disease. Chronic leukemia is best treated by external irradiation. Acute leukemia responds best to steroids and antimetabolites. Blood transfusions are important ancillary measures in all forms of leukemia. Although results of treatment leave much to be desired, more effective agents may soon evolve as a result of intensive investigations now in progress.

- "Acetyl-Digitoxin — A Clinical Study" by Arthur Bernstein, M.D., Edgar Kogan, M.D., and Irving E. Cohen, M.D., of Martland Medical Center, Newark, New Jersey, presents case reports of 12 patients with congestive heart failure who were treated with this drug. The preparation proved safe and effective in initial digitalization and redigitalization. Toxic symptoms were dissipated at a rapid rate. These results serve to demonstrate the value of this glycoside in the treatment of cardiac failure.

MEETINGS AND ANNOUNCEMENTS

EXAMINATION FOR FELLOWS OF THE INTERNATIONAL COLLEGE OF SURGEONS
Examinations for qualified fellows of the International College of Surgeons will be held in Chicago, July 23 and 24 and October 29 and 30. Oral conferences will be given August 6 and October 22. For details, write the Secretary of the Qualifications Council, International College of Surgeons, 1516 Lake Shore Drive, Chicago.

BLOOD BANK ASSOCIATION

The annual meeting of the American Association of Blood Banks will be held September 3 through 5 at the Somerset Hotel, Boston. Direct inquiries to Miss Marjorie Saunders, Secretary, 725 Doctors Building, 3707 Gaston Avenue, Dallas, Texas.

PUBLIC HEALTH MEETING

The annual meeting of the American Public Health Association and 40 related organizations will be held in Convention Hall, Atlantic City, November 12 to 16. Explorations into the question "Where Are We Going in Public Health?" undertaken at the last meeting will be continued. This year a new section on Mental Health has been added.

COURSE IN PEDIATRIC ALLERGY

New York Medical College, Flower and Fifth Avenue Hospitals announces a postgraduate course in Pediatric Allergy on Wednesdays, 9 A.M. to 4 P.M., November 27, 1956 to May 29, 1957. The course will consist of lecture-seminars, laboratory and clinical procedures, clinic work, ward rounds, and animal experiments covering principles of diagnosis and treatment of allergy in children and applied immunology. Fee is \$300. Apply: Office of the Dean, New York Medical College, Fifth Avenue at 106th Street, New York City 29.

EYE SPECIALISTS PLAN CONGRESS

The Fourth Interim Congress of the Pan American Association of Ophthalmology will take place in New York City at Hotel Statler, April 7 to 10, 1957. The Congress will be held in conjunction with the annual meeting of the National Society for Prevention of Blindness. Those wishing to present papers should write to Dr. John M. McLean, New York Hospital, 525 East 68th Street, New York City 21.



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*Murray, R. J.: N. Y. State J. Med. 53:1867, 1953.

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Current Status of Chlorpromazine and Reserpine in Psychiatric Practice

BURTRUM C. SCHIELE, M.D.,
RICHARD W. ANDERSON, M.D., and
WERNER SIMON, M.D.

Minneapolis, Minnesota

FOR MANY YEARS, physicians have sought drugs which would effectively relieve anxiety and lessen behavior disturbance. Psychiatrists, who treat a large number of patients whose symptoms fall into these categories, have given enthusiastic clinical application to a variety of drugs, including paraldehyde, chloral hydrate, bromides, and more recently various barbituric acid derivatives. In many instances, these drugs effectively relieved the above symptoms, but all shared the disadvantage of soporific properties which often rendered the patient inaccessible to psychotherapy and environmental treatment or, in the case of office patients, unable to carry on daily activities. Thus, the therapeutic effectiveness of these drugs was limited, since dosage for most patients had to be maintained at a level which did not effectively relieve anxiety.

On this basis, the avid reception and great

amount of clinical research that followed within a few months after Delay's initial report of the clinical use of chlorpromazine in 1952, can be readily understood, for this new drug was reported to produce effective relief from tension with minimum side effects. In two years, the literature on this drug alone became so voluminous that the full-time research staff of the American manufacturer could barely keep pace with it. Thus, a review of the literature at this point is not feasible; we shall present instead a digest of more recent reports and conferences and our own clinical experience.

Clinical trials of the alkaloids extracted from *Rauwolfia serpentina* indicated that these too had a sedative but not hypnotic effect. Reserpine appeared to be the most effective and has also had wide clinical application in a great variety of psychiatric and neurologic disorders in addition to its principal use in the control of hypertension. Reserpine and chlorpromazine are the most widely used of the so-called "tranquilizers" now held by many to be placing us on the threshold of a new era of psychiatric therapy.

THE PHARMACOLOGY OF CHLORPROMAZINE

Chlorpromazine is a synthetic, nonbarbiturate central nervous system depressant. It is a phenothiazine derivative, a congener of Phenergan, and closely related structurally to an antihista-

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minic drug. The drug depresses the central and autonomic nervous systems, and, in most individuals, it potentiates the action of anesthetics, sedatives, analgesics, narcotics, and alcohol. It blocks apomorphine-induced emesis by depressing the chemoreceptor trigger zone. Among the most provocative findings is the capacity of chlorpromazine to abolish psychotic-like symptoms experimentally produced with lysergic acid. It has been postulated that chlorpromazine depresses the reticular formation, but the drug is generally believed to produce a change in synaptic transfer between cortex and diencephalon by increasing cortical inhibition of the brain stem which leads to quietude and sedation. The recent work of Benditt and Rowley has shown that chlorpromazine is a strong epinephrine blocking drug, in addition to being a mild blocking agent for histamine, acetylcholine, noradrenalin, and 5 hydroxytryptanin (serotonin). These observations also suggest that the action of the drug is primarily on the synaptic transfer.

Chlorpromazine is readily absorbed, whether given orally, parenterally, or rectally. The action of the drug in the body is poorly understood. However, it is quickly metabolized, and no significant drug plasma levels, even after large doses, can be demonstrated. Less than 1 per cent of the drug has been recovered from twenty-four-hour urine samples.

Chlorpromazine may reduce blood pressure in both normotensive and hypertensive patients, regardless of the route of administration. The maximum fall in pressure usually occurs thirty minutes after intramuscular injection; with oral therapy, after sixty to ninety minutes. This hypotensive effect is less frequently observed when the patient is recumbent, but, if the patient stands up, orthostatic hypotension becomes manifest. As a rule, tolerance to the hypotensive effect of the drug develops, so that after three to four weeks of continued medication, no significant lowering of blood pressure is observed. Electrocardiographic studies, conducted in patients receiving the drug therapeutically and in control subjects, showed no definite irregularities in short- or long-term therapy.

Cerebral hemodynamic studies have shown a decrease in cerebral blood flow in conjunction with a reduction in blood pressure, but the arteriovenous oxygen difference increases and, thus, cerebral oxygen uptake is maintained. Electroencephalographic studies indicate that chlorpromazine produces a pattern similar to normal sleep in contrast to barbiturates which produce a rapid rhythm. The drug affects the thermal regulatory center and may cause hypothermia

and occasionally a slight fever. Renal studies reveal no consistent alteration of either the glomerular filtration rate or renal plasma flow. Analyses of plasma sodium and potassium show no appreciable changes in electrolyte concentration.

Chlorpromazine inhibits gastrointestinal motility by its effect on the autonomic nervous system as well as by its direct inhibitory action on smooth muscles. Given to patients in large doses, it may produce pronounced constipation, although occasionally diarrhea occurs.

The great variability of reported pharmacologic effects of this drug appears to depend in part upon the often apparently capricious autonomic responses which vary so greatly among different individuals.

THE PHARMACOLOGY OF RESERPINE

Reserpine is a crystalline alkaloid from the crude extract of the whole root of *Rauwolfia serpentina* Benth. It is an effective hypotensive agent, lowering the blood pressure through central action. It is not a ganglionic nor adrenergic blocking agent, having no influence on postural reflexes. It has low toxicity. The mode of action of reserpine, according to Bein, consists of reducing the activity of the sympathetic regulating centers, which results in signs of parasympathetic predominance, such as miosis, hypothermia, hypotension, bradycardia, increase in gastrointestinal activity, and general inactivation or tranquilization. This central sympathetic depressant effect of reserpine is not believed to be due to a direct depression of central sympathetic structures, but rather to an inhibition of afferent impulses which activate these centers under normal conditions.

Indications are that reserpine might have a far more general influence on the central nervous system than previously assumed and believed to be restricted to autonomic functions. Animals receiving large doses of the drug could be aroused easily from their state of tranquilization, a condition which could be distinguished electroencephalographically from sleep induced by barbiturates. Reserpine has been reported to have a stimulating effect on the reticular formation in the brain stem. Signs of Parkinson's disease have been observed in patients under prolonged treatment with large doses of the drug, and it has been demonstrated that the convulsive threshold in electroshock therapy is lowered after medication with reserpine.

Removal of the cerebral cortex is generally known to produce a state of sham rage, a phenomenon caused by abolishment of the inhibitory function of the cortex on the brain stem, especi-

ally the diencephalic area. Reserpine abolishes sham rage phenomena in experimental animals. We may, therefore, postulate that reserpine increases cortical inhibition of diencephalic structures. This assumption is further supported by the appearance of a state of quietude, miosis, hypotension, bradycardia, and hypothermia, which are all signs of parasympathetic dominance when reserpine is administered.

CLINICAL USES OF CHLORPROMAZINE AND RESERPINE

It may be several years before we can accurately appraise the clinical effectiveness of these drugs. However, the following statements approximate a consensus of current opinion regarding the clinical value of chlorpromazine and reserpine in the various psychiatric disorders.

The immediate effects of the tranquilizing drugs are reasonably well understood. Given in adequate dosage, they produce a soothing effect and relaxation without euphoria in a way formerly unknown to us. The average excited patient is readily controlled. His excitement subsides in a few hours if the parenteral route is used. The "tranquilized" patient sleeps readily and for long periods of time and yet is easily awakened. When awake his eyelids may droop and he may appear somewhat "doped," but upon examination he is found to be clear mentally and to show good motor coordination. He is usually calm, reasonable, and cooperative and may have good insight into the fact that he was recently very disturbed and upset. This type of remarkable change in the patient's demeanor and attitude could not have occurred with sedatives previously available. If barbiturates were given in sufficient quantities to control such an excited patient, he would be so groggy that he could not function adequately either mentally or physically. Furthermore, to continue giving such a patient large amounts of barbiturates would be very hazardous, whereas heavy administration of chlorpromazine and reserpine can usually be safely continued over a period of weeks, if need be.

Thus, we find, as would be expected, that symptomatic relief is obtained in conditions characterized by excitement, such as may be found in delirium, the manic phase of the manic-depressive psychosis, and some acute schizophrenic conditions and panic states. In delirium, as a rule, the quieting effect of the drugs may be needed for only a few days, while in the case of the manic and schizophrenic excitements, the drug may be required in higher dosage for a period of several weeks or more.

Similarly, tension and agitation found in a wide variety of psychiatric conditions may also be relieved. Since the treatment is largely symptomatic, they are often prescribed without special reference to the exact diagnosis. For example, these drugs are finding wide clinical use in such conditions as ambulatory schizophrenia, agitated senile states, behavior disturbances in both children and adults, and many psychoneuroses.

The peaceful feeling usually obtained with these drugs is believed by many to allow the patient to benefit more rapidly from psychotherapy. Therapy aimed at correction of the causal factors is to be preferred whenever feasible. Thus, in the treatment of psychoneurotics, psychotherapy is usually the treatment of choice, since it has a more far-reaching effect and offers the best prospect of lasting benefit. Symptomatic therapy, while of a lower priority, nevertheless is indicated for relief of suffering and as an adjunct to the more fundamental psychotherapeutic processes.

In the treatment of agitated seniles, however, no very effective causal therapy is available. The long-sustained relief of agitation in some of these miserable people is truly gratifying.

One of the most exciting aspects of the new drug therapy is the possibility of relief for some of the thousands of chronic patients now housed in mental institutions. From many state hospitals we have reports indicating that: (1) The need for electroshock treatment and insulin treatment is much less than previously. Drug therapy has proved to be safer and easier to administer and more pleasant for the patient. (2) Cost of drug therapy, while considerable, is offset by the reduction in expense resulting from less destruction of hospital property. (3) With the method available to control large numbers of disturbed patients, physicians, nurses, and other ancillary therapists are now able to devote more effort to psychotherapeutic measures and to milieu therapy. This fact alone has changed the formerly pessimistic outlook in many of the state hospitals to one of greater optimism. (4) The reports further indicate that many chronic patients have benefited, including those who previously had failed to show sustained improvement after insulin or electroshock therapy or even after lobotomy. A few of these patients returned home, but improvement in the vast majority was apparent in better social relations, tidier appearance, and less overt symptomatology. Some evidence indicates that these chronic patients benefit somewhat in proportion to the duration of their illness and to the amount of tension which they display.

We are uncertain about the long-range efficacy of this drug treatment. Many chronically ill patients have improved, only to relapse promptly when the drugs are discontinued. A number of investigators have felt that some individuals may need to remain on a maintenance dose indefinitely.

It may be postulated that in those patients who attain lasting benefit from a period of drug therapy, the reduction of anxiety allows the natural integrative forces to function again, thus preventing further decompensation in personality function. There have been a number of speculations that chlorpromazine or reserpine may do more than offer symptomatic relief. In this respect, the clinical impression is widely held that electroshock treatment and also insulin shock treatment are facilitated by prior or concurrent administration of chlorpromazine. For example, repeated observations have shown that patients who are taking this drug do not need as many shock treatments to produce a symptomatic remission as they needed on previous occasions. The concurrent use of reserpine and electroshock therapy appears to be contraindicated because of the danger of prolonged apnea and vasomotor collapse.

Chlorpromazine and reserpine have also been heralded as useful therapeutic agents in a number of other medical conditions, such as relief of nausea and vomiting (chlorpromazine); the potentiation of hypnotics and relief of intractable pain (chlorpromazine); and relief of severe chorea, including Huntington's chorea (reserpine).

Clinical limitations are not too clearly understood. Some individuals do not obtain much, if any, therapeutic benefit even though adequate doses of the drugs are administered. Some types of reactions, such as simple schizophrenia, do not respond favorably. While agitated and depressed patients may be relieved of their agitation and tension, most cases of depression do not respond to these drugs; in some instances, the depression may become worse. Electroshock therapy is still the treatment of choice in severely depressed individuals. Many psychoneurotic patients do not obtain any real benefit. This is particularly true of the obsessive-compulsive group. The value and limitations of these drugs in the office treatment of ambulatory patients is less clearly defined than for hospital patients.

DOSAGE

Doses of both these drugs in their psychiatric applications usually far exceed those administered in general medical practice. Each investi-

gator seems to have set up a different dosage schedule, and, similarly, treatment has been carried on for periods of time ranging from a few days to many months. For example, a pattern of intensive chlorpromazine treatment calls for doses to be increased by 400 mg. per day to a maximum of 4,000 mg. per day. This high dosage is maintained for ten to twenty days and is then decreased by similar amounts to a maintenance level of 200 to 400 mg. per day. Investigators using doses of this order are labeled "high-dosers" in contrast to "low-dosers," who slowly build up to a daily dose of 900 mg. or less. The former have not yet demonstrated conclusively that the high levels do anything more than relieve symptoms. This leaves the matter of dosage of either drug quite dependent upon close clinical observation of each patient's response, with regulation upward or downward according to the symptomatic relief and side effects observed in any given case.

The larger doses of both drugs are generally given to hospitalized psychotic patients. Symptomatic benefit of ambulatory neurotic patients may be obtained with oral doses of chlorpromazine of 75 to 150 mg. per day. Reserpine in oral doses of 1 to 8 mg. per day is recommended for ambulatory patients, but relief is obtained more slowly and is often less dramatic. In general, both drugs exert their effect more slowly than the barbiturates, and it has become standard practice to give each drug intramuscularly when rapid relief of anxiety or behavior disturbance is desired. The symptoms of delirium tremens may be dramatically relieved by a few injections of chlorpromazine, which has the additional benefit of relieving nausea and vomiting.

Reserpine is generally given intramuscularly in doses of 2.5 to 5.0 mg. twice a day for three to four days, with the intramuscular doses gradually replaced by tablets given orally. Patients have tolerated doses of 130 mg. per day, and the prevalent practice of administering large doses has resulted in the manufacture of a special 4-mg. tablet for psychiatric use. On the average, 8 or 10 mg. per day by either route produces notable tranquilizing effects on all but the most disturbed patients.

SIDE REACTIONS OCCURRING WITH USE OF CHLORPROMAZINE

The majority of patients are able to tolerate chlorpromazine even in very high dosage without undue discomfort or difficulty. Side reactions may be more or less annoying but, as a rule, do not necessitate termination of the drug. The following side reactions are common: (1)

drowsiness, (2) palpitation, (3) vertigo upon arising, (4) nasal stuffiness, (5) constipation, (6) weakness of the legs, (7) miosis, and (8) pain at the site of injection when given intramuscularly.

Uncommon side reactions are: (1) epigastric distress or vomiting, (2) syncope (from hypotension), (3) diarrhea, (4) accommodation difficulties and other visual disturbances, (5) stomatitis from chewing the pills, (6) engorgement of the breasts, lactation, and (7) contact dermatitis in nurses handling chlorpromazine solutions for injection.

The type of side reaction may vary greatly among individuals. For instance, use of chlorpromazine commonly results in pronounced constipation, but severe diarrhea develops in an occasional individual. Fortunately, most side reactions are temporary and disappear after a week or two even though the drug is continued. If of necessity the drug has been discontinued, in many instances it can be used again after a period of time without reappearance of the side reaction. Most side reactions and complications occur more or less irrespective of dosage.

Because of their either mild or temporary nature, the side reactions listed previously do not require particular treatment. Amphetamine, or a similar drug, may be useful in combating drowsiness. Hypotension and palpitation, if pronounced, can be treated with bed rest and gradual ambulation. Syncope may occur early in treatment, and careful nursing observation is indicated especially in elderly patients.

COMPLICATIONS OCCURRING WITH USE OF CHLORPROMAZINE

More serious reactions which may necessitate the interruption of therapy are:

1. *Dermatologic disturbances* may develop during the first ten to twenty days of treatment. This is most often a maculopapular rash and is usually limited to the arms or legs but may be generalized. Itching may occur, but this disturbance usually subsides if the dosage is reduced or if the drug is discontinued for a week or two. The dermatologic eruption does not reappear when the drug is readministered. Solar erythema resulting from photosensitivity occurs in susceptible individuals upon exposure to sunlight and may be severe. Edema and swelling of the face and throat may occur in association with exposure to the sun. Patients taking chlorpromazine should avoid prolonged exposure to sunlight until their susceptibility has been determined.

2. *Jaundice* may appear between the second and fourth weeks of chlorpromazine administra-

tion or after the drug has been discontinued. This condition rarely occurs in patients who have received the drug for only a few days. Its incidence in nearly 8,000 patients who had been on high dosage, long-term therapy was 1.4 per cent. Its incidence in over 1,000 office patients receiving lower dosage was 0.8 per cent. Jaundice is often heralded by mild grippe-like symptoms. Laboratory and experimental evidence indicate that it is an obstructive type caused by stasis in the biliary tree. Unnecessary surgical interference was resorted to in early cases before these facts were widely understood. As yet evidence does not conclusively indicate that permanent liver damage occurs.

During the first six weeks of chlorpromazine therapy, the possibility of jaundice should be kept in mind. Repeated clinical inspection of the patient and weekly urine tests for bile are the most practical methods of early diagnosis of jaundice. We use the "Ictotest" at the University of Minnesota hospitals. The drug should always be discontinued if jaundice appears. Most cases of jaundice caused by chlorpromazine are mild and clear up rather quickly after the drug has been discontinued. In some instances, however, the patient may be quite seriously ill, and the jaundice may not disappear for many weeks. Rest, high-protein, and high-calory diet, and vitamins are indicated.

3. *Agranulocytosis* is the most serious complication that may result from chlorpromazine therapy; fortunately, this condition is rare. Even if there are several times as many cases as have been reported, the incidence of this complication appears to be less than 1 in 100,000. Agranulocytosis appears from the fifth to the seventh week after the onset of chlorpromazine administration. Most of the patients are women. In most case reports in which this reaction developed, dosages were from 30 to 200 mg. daily. The agranulocytic reaction may be asymptomatic or nearly so. On the other hand, the first sign of illness may be the sudden onset of fever and other signs of angina. Outcome has been fatal in a few cases. If this reaction is detected early enough, patients generally respond favorably in seven to fourteen days. Treatment includes discontinuing the drug, reverse isolation, a protective umbrella of antibiotics, and the possible use of ACTH and similar agents.

Even though the reaction is rare, ambulatory patients should be warned to report to the physician at the first sign of fever or intercurrent illness. During the first two months of chlorpromazine therapy, occasional white blood counts are indicated. This is especially important in those

who may be unable to report obscure symptoms.

4. *Neurologic disturbances.* Parkinson-like symptoms occur usually in patients who have been on the drug a number of weeks, particularly if the dose has been high. A typical parkinsonian picture with pill-rolling tremor, muscular rigidity, and mask-like facies develops in some patients. A number of investigators felt that some chronically ill patients did not improve significantly until they had developed the parkinsonian picture.

Other patients have shown dystonia, and, rarely, pronounced confusion has developed. A few patients have been reported to have had convulsive seizures. The data reported on these cases are incomplete. All of these symptoms clear within a few weeks after the medication is discontinued.

5. *Other complications.* Hyperpyrexia of several days' duration with gripe-like symptoms is occasionally observed. The eosinophil count may be increased in these cases. One case of fatal hyperpyrexia has been reported.

SIDE REACTIONS PRODUCED BY RESERPINE

A number of these side reactions are similar to those produced by chlorpromazine, such as: (1) drowsiness, (2) sensation of weakness and aching in the legs, (3) nasal stuffiness, and (4) hypotension.

The following reactions, however, are not found as a rule with chlorpromazine which, in fact, tends to have the opposite effect: (1) salivation, (2) bradycardia, (3) nausea and vomiting, and (4) diarrhea.

Uncommon side reactions include: (1) coryza, (2) flushing of the face and sclerae after parenteral administration, (3) edema of the face, hands, and feet, (4) polydipsia and polyuria, and (5) syncope.

These side reactions are generally self-limited and do not require treatment. Several of them can be controlled or prevented by the concurrent administration of chlorpromazine.

COMPLICATIONS PRODUCED BY RESERPINE THERAPY

Complications occur less frequently and are less serious than those produced by chlorpromazine. They are:

1. *Parkinson-like syndrome.* A parkinsonian picture with tremor, rigidity, and mask-like facies frequently develops in patients who are on a moderate to high dosage for many weeks or months. If reserpine is discontinued, these symptoms gradually subside over a period of ten to twenty days. Many investigators claim that

chronic patients begin to show signs of psychiatric improvement coincident with the onset of Parkinson-like symptoms and hence are loath to discontinue the medication for this reason. These symptoms may be controlled to a considerable degree by reducing the dose slightly and administering methanesulfonate (Cogentin) or some similar preparation.

2. *Depression.* Typical depressive reactions, both mild and severe, have been reported by a number of investigators. These have usually occurred in individuals who had a history of previous depression or a history of longstanding tension and anxiety. Many such patients had been given reserpine in small doses for long periods of time for relief of hypertension. Careful clinical observation for symptoms of depression in these patients is indicated. In a good number of these depressions, psychiatric treatment, including electroshock, has been necessary, but most patients recover after reserpine is discontinued. Amphetamine and related substances are helpful in relieving the milder cases.

3. *Mental confusion.* This complication has occurred in a few patients on high doses of reserpine. This is a serious condition and the drug should be discontinued, at least temporarily.

SUMMARY

1. The tranquilizing properties of these drugs are unique; in most patients, a state of quietude with little or no clouding of consciousness is produced. This effect makes these drugs the most useful available today for the management of acute states of excitement.

2. The relief of tension and excitement produced by these drugs has already resulted in pronounced reduction in somatic treatment (electroshock therapy, insulin coma treatment, and lobotomy), formerly widely used to control these symptoms.

3. The value of these drugs in the treatment of office patients is not nearly as clear as in the treatment of hospitalized psychiatric patients. However, since tension and anxiety are so often relieved, the physician may be afforded an opportunity to help the patient deal with causative factors with less risk of precipitating overwhelming anxiety. In other words, these drugs facilitate psychotherapy; they do not substitute for it.

4. Some individuals do not obtain beneficial effect from these drugs even when they are given in large doses. Paradoxically, others not only fail to become tranquilized but develop pronounced restlessness.

5. While most patients tolerate either or both of these drugs without difficulty, annoying side

reactions occur which occasionally are serious, particularly with chlorpromazine.

6. Reserpine appears to be slower in its action, less potent, and less toxic. In most respects, the two drugs produce similar effects, although chlorpromazine is preferred when rapid, potent action is required in the treatment of manics or other excited patients.

7. Neither drug seems to ameliorate states of depression, although there are exceptions. In some patients, depression becomes worse with the use of these drugs.

8. Many enthusiastic reports are appearing in the medical literature as well as the lay press concerning the treatment of chronic patients in state hospitals. Many are reported to have improved and some to have been discharged. These include chronic patients who had failed to respond to all other forms of treatment, including lobotomy. On the other hand, the wholesale

emptying of state hospital beds has not occurred, such as a few of the more enthusiastic reports had predicted. Only the future will tell the true effectiveness of these drugs. Their value in acute states has been clearly demonstrated. Chronic patients benefit, but less consistently. Long-term use of these drugs in maintaining improvement still requires further study and evaluation.

9. Because of the therapeutic results obtained with these new drugs, a wave of optimism has arisen in the field of psychiatry. Some physicians have proclaimed the beginning of a new era. While it is very encouraging that pharmacologic agents are now available which relieve distressing symptoms for so many patients, we cannot conceive of any drug that will solve life's problems or alter basic personality structure. Better drugs will undoubtedly follow, but therapy will still involve the process of learning, working through of problems, and maturation.

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EXCESSIVE ROTATION of the neck may damage the vertebral arteries, resulting in brain injury and sometimes in death.

Frank R. Ford, M.D., and David Clark, M.D., Johns Hopkins Hospital, Baltimore, report that immediate signs of damage to the brain stem developed in 2 patients after sudden passive twisting of the head; 1 patient survived with persistent neurologic symptoms, and the other became hemiplegic and died within sixty hours. Postmortem examination revealed basilar artery thrombosis and hemorrhage and softening in the left cerebellar hemisphere. No fractures or dislocations were found, and the arteries were histologically normal.

Occlusion of the vertebral arteries at the joint between the axis and the atlas is probably responsible for the initial symptoms. Thrombosis of the basilar artery may result from stasis, and ischemic damage to the brain ensues. Defect of the odontoid ligaments may predispose to injury from head rotation.

FRANK R. FORD, and DAVID CLARK: *Bull. Johns Hopkins Hosp.* 98:37-42, 1956.

Pitfalls in Surgery

EDWARD R. WOODWARD, M.D.

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THIS PAPER might very well be subtitled "My Mistakes, and How to Avoid Them." I am particularly well qualified to speak on this subject. Since most of my atrocities have been committed within the abdomen, particular attention shall be given to this important area of general surgery and then to some more general topics of importance to surgeons.

One of the most important pitfalls that the surgeon is just beginning to learn to avoid is that involving esophageal hiatal hernia. The frequency with which this lesion occurs and how seldom it produces significant symptomatology is now appreciated. It is important that we avoid attributing multiple functional abdominal complaints to an incidentally discovered hiatal hernia. Repair of the hernia may result in a very unhappy patient, and the postoperative recurrence rate is distressingly high.

An interesting variation of esophageal hiatal hernia is its association with peptic esophagitis and peptic ulcer of the esophagus. This type of hernia is always the concentric and not the paraesophageal variety, since the former interferes with the competency of the cardiac sphincter mechanism. Although hemorrhage and perforation occasionally occur with these lesions, the real hazard of their prolonged presence is the development of benign esophageal stricture. Medical treatment is inadequate prophylaxis for this complication, because of the exquisite susceptibility of the esophageal mucosa to peptic digestion. Therefore, the presence of peptic esophagitis is an indication for surgical repair of the hernia. It is important to recognize that peptic esophagitis does not usually occur in a patient with hiatal hernia if his gastric secretory function is normal. Such a patient should be considered to have duodenal ulcer diathesis, and this can, in fact, usually be demonstrated by roentgenogram and/or gastric secretory studies. Because esophageal hiatal herniorrhaphy is fraught with a serious possibility of recurrence

and, even without recurrence, competence of the cardiac sphincter mechanism is not assured, the hernia repair should be simultaneously combined with a definitive operative procedure for peptic ulcer.

A second common pitfall in abdominal surgery today is presented by the benign gastric ulcer. The presence of such a lesion produces high-grade hysteria in all professional personnel involved, leading to a great deal of unnecessary surgery. In most cases, the benignity of an ulcerated lesion of the stomach can be adequately determined nonoperatively. Probably the most accurate measure in this regard is the "test of healing." An ulcerated cancer does not heal and remain healed. The panic to get such a patient on an operating table can perhaps be averted if one recalls that the five-year survival rate for gastric cancer is *directly* not *inversely* proportional to duration of symptoms preoperatively.

Particular problems are presented by two types of gastric ulcer. The first of these is the prepyloric ulcer. This is a frequent roentgen diagnosis and an infrequent surgical or pathologic finding. Most lesions are found by direct observation to be on the duodenal side of the pylorus. These lesions behave as duodenal ulcers; the basal gastric secretion shows excessive quantities of hydrochloric acid production, and this difference is reliable enough to be used as a differential diagnostic measure. Nonsurgical therapy is equally as efficacious as in duodenal ulcer.

The second specific problem is the gastric ulcer situated high on the lesser curvature. An extremely radical or total gastrectomy is never justified for such a lesion, unless it is proved malignant. The mortality risk and the nutritional sequelae are too serious when contrasted with the discouragingly low salvage rate in malignancy. It is my policy in doubtful cases to resect the stomach below the ulcer. The proximal stomach can be opened and its interior inspected and even extensively biopsied. If the lesion proves benign, satisfactory and persistent healing occurs after distal gastrectomy.

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Presented before the regional meeting, American College of Surgeons, Colorado Springs, Colorado, March 7, 1956.

In the surgical treatment of duodenal ulcer, we have learned to avoid the antrum exclusion operation because of the prohibitively high incidence of postoperative marginal ulcer. I bring up this subject because we now have a full physiologic explanation for this unexpected hazard. It has been clearly demonstrated that the antrum of the stomach functions as an endocrine organ, releasing, in response to stimulation by food or distention, the hormone "gastrin." This hormone powerfully stimulates the body of the stomach to secrete acid gastric juice — the "gastric phase" of gastric secretion. This normal physiologic mechanism is completely inhibited at a strongly acid pH, in the neighborhood of 1 to 1.5. We have postulated that this represents an autoregulatory device which, under normal conditions, terminates the gastric phase of gastric secretion. On the other hand, the surgically excluded antrum exists in a neutral or even alkaline environment. In a series of dogs prepared with isolated Heidenhain pouches, the antrum of the stomach was surgically excluded along with a portion of the body of the stomach (figure 1). Gastric juice was collected from the Heidenhain pouch for several weeks, and then the acid-secreting mucosa was completely excised from the excluded antrum during a second operative procedure. In all four animals, secretion from the Heidenhain pouch increased greatly after the second procedure (figure 2), indicating excessive release of gastrin. This demonstrates that, not only do we know that the antrum exclusion operation is unsound for duodenal ulcer, but we also have a complete explanation of the pathologic physiology concerned.

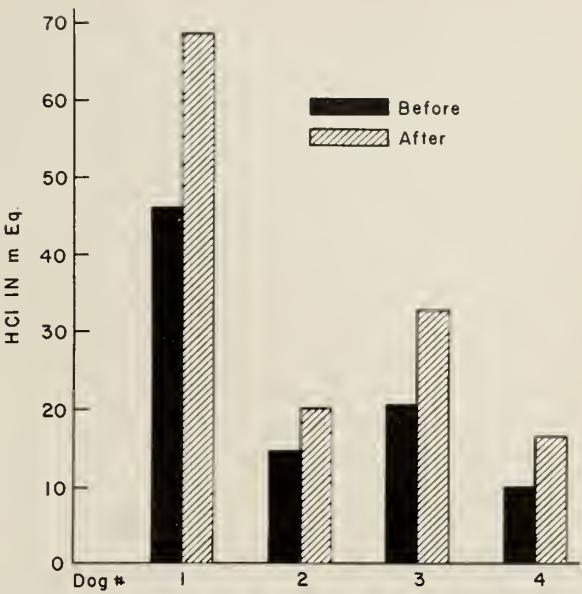


Fig. 2. Effect of excising acid-secreting mucosa from the excluded antrum.

After the development twenty years ago of surgical procedures for removal of all or a part of the pancreas, a wave of enthusiasm arose for the attempted surgical cure of pancreatic cancer. In spite of this intense effort, the number of five-year survivors after pancreatoduodenectomy for carcinoma of the pancreas is extremely small. It is apparent, at least to me, that this salvage rate has not justified the extremely high mortality and morbidity associated with this procedure, to say nothing of the economic and emotional cost. As a palliative procedure, this radical surgery has been less successful than simple

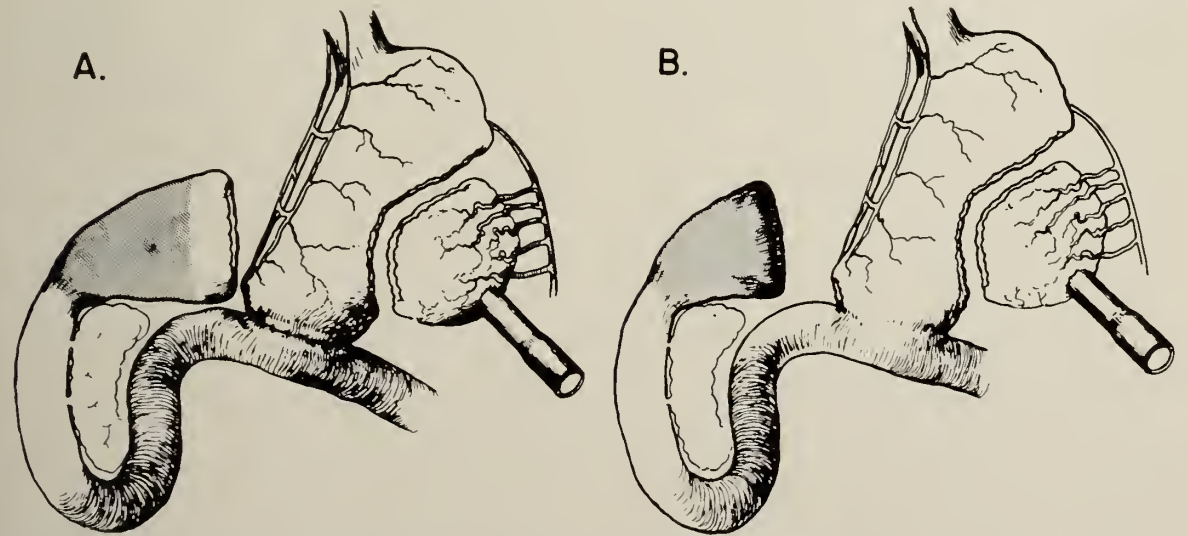


Fig. 1. Diagrams of surgical procedures performed showing (a) Heidenhain pouch in dog with the antrum excluded along with a cuff of acid-secreting body, and (b) the acid-secreting mucosa removed from the excluded antrum.

by-pass anastomoses. Therefore, attempting surgical cure of pancreatic cancer is a pitfall in which most of us will not fall. Is there a lesion of this type favorable enough to justify such an attempt? We must each answer this question for ourselves as the individual case presents at laparotomy. Parenthetically, it is important to point out that carcinoma of the ampulla of Vater is a completely different problem and is amenable to surgical cure in a reasonable per cent of cases.

This brings up the problem of radical surgery in general as used for treating visceral cancer. We are all aware that in our present state of ignorance, surgery is the only important therapeutic weapon which offers a hope for cure in the great majority of malignant diseases. Nevertheless, we must humbly recognize the limitations of surgery in treating this dreadful disease, and we must not overstep the precept which states, "Above all, do no harm." Biologic variation between cancers is tremendous, not only in different organ systems but even in the same organ, so that no hard and fast rules can be laid down. Some cancers are usually more amenable to radical surgery than others, even when rather extensive involvement is present. Recognition of these lesions is a matter of experience and judgment, but we must also be prepared to admit defeat and to attempt only those surgical procedures that offer the victim terminal comfort.

The current trend is to extend the scope of surgery for more favorable and confined malignant lesions, particularly in the breast, stomach, and colon. These efforts must be considered a well-conceived clinical experiment, and it remains to be seen whether or not the inevitably increased mortality and morbidity will "pay off" in terms of increased long-term survivors. In the meantime, those of us who are not involved in these research efforts must restrict ourselves to the standard classic operative procedures for these lesions.

In the area of gallbladder surgery, the myth of the so-called silent "gallstone" has been so thoroughly exploded in surgical circles that this need not be mentioned as a pitfall. Unfortunately, many of our medical colleagues are less thoroughly aware of this situation. The recently available intravenous dye substances for visualization of the biliary tree have been very helpful in avoiding the pitfalls of operating in acute abdominal situations which seem to involve the biliary tract. Other new drugs, however, have increased our problems, and I have particular reference to chlorpromazine (Thorazine). This substance, while pharmacologically useful, has the unfortunate side-effect of causing icterus in

approximately 1 per cent of patients. The jaundice frequently mimics that characteristic of obstructive jaundice, and needless operations for supposed stone, tumor, or stricture are becoming more and more frequent. Apparently, a careful history of medications that have been taken is the only way to avoid this pitfall.

The nonoperative treatment of appendicitis is a disaster into which we see some of our colleagues in medicine, pediatrics, or general practice fall. This is based on a misconception concerning the pathogenesis and the progress of pathology in this disease. It is obvious to us that penicillin does not cure an appendix whose lumen is obstructed with a fecalith and whose wall is gangrenous from interference with the blood supply thereby produced. Antibiotic therapy has a pronounced effect on over-all mortality, but morbidity is much lower in patients routinely treated in the traditional surgical fashion.

The three traditional ways to treat the appendiceal stump are: (1) ligation plus inversion, (2) ligation without inversion, and (3) inversion without ligation. Violent argument and harsh words can arise in any surgical group when this topic is discussed. Since the results are excellent with all three, the disagreements are obviously of no importance, and I raise this problem to point out what seems to me to be an important pitfall in surgery. This is over-concern, practically to the point of self-hypnosis with trivial and unimportant technical details. Another point where this ridiculous obsession obtains is in sutures and suture technics. Some surgeons like No. 2 chronic catgut and use nothing but continuous sutures, whereas others rebel at anything larger than No. 6-0 silk and use only interrupted sutures. Catgut, silk, cotton, nylon, linen, wire — many good surgeons use each with fine results. The modern obsession with ultra fine sutures has been carried to the point where I must encourage new assistants to apply enough tension on a tie to at least coapt the tissues.

The use of antibiotics in surgery has come in for a great deal of comment in the last few years, largely because of abuse. The fact has been well demonstrated that after clean surgery, antibiotics offer no significant degree of protection against wound infection. Some of these agents have produced a disturbing number of untoward side effects, and their unnecessary use has so sensitized many individuals that the use of antibiotics under urgent conditions is precluded. Some surgeons feel that the availability of antibiotics has caused a gradual decline in the degree of care with which aseptic technic is used. If this is so, it is a pitfall we must evade.

Certainly, in the routine herniorrhaphy or thyroidectomy, the use of antibiotics postoperatively is unwarranted. I feel that in most operations involving the biliary or upper gastrointestinal tracts, postoperative antibiotics are unnecessary.

Another unfortunate side-effect of the extensive use of antibiotics has been the perforce selection of the bacterial population in our hospitals. Susceptible strains of common organisms have been selectively suppressed so that at the present time perhaps 95 per cent of all hospital cultures of hemolytic *Staphylococcus aureus* are nearly completely drug resistant.

One of the most catastrophic effects of the overuse of antibiotics has been the sharp rise in the incidence of postoperative acute pseudomembranous enterocolitis. This dreadful complication of surgery has been particularly prone to follow the use of the tetracycline group of drugs and is apparently due to the overgrowth of enterotoxin producing staphylococci in the intestinal tract depleted of its usual bacterial flora.

Certainly, the potential hazards of antibiotic drugs must be recognized and also their very great value when used under proper conditions.

Surgeons have benefited enormously from the rapid development of anesthesiology in recent years. This has been not only a pharmacologic advance but a professional one as well. The expanding trend toward the use of professional M.D. anesthetists will continue to have an important effect on surgical mortality and, particularly, morbidity. I would be reluctant to embark upon any major surgical procedure without an M.D. anesthetist at the head of the table. This indicates the increasing importance of teamwork in modern surgery. The operating room is no longer for prima donna surgeons; it is a place where professional people with special skills gather under direction of the surgeon-in-charge to administer surgical therapy to the patient.

In this modern era of surgery, the trend has been away from eight-minute appendectomies, and we now see fourteen-hour craniotomies. Improvements in anesthesia and the development of our knowledge of blood, fluid, and electrolyte replacement have allowed more leisurely operations, with the obvious advantages of exposure, careful dissection, and careful repair. In many cases, too much time is taken; as one surgeon has said, "We operate by the calendar instead of by the clock." Time is still a precious resource which we must conserve within reason, for surgery, no matter how careful, is still traumatic and anesthesia, no matter how good, is still toxic.

Another important factor in the safety with

which extensive surgery can be performed has been the rapidly increasing availability of blood through our modern system of blood banks. As with so many other useful measures, overuse of blood transfusions has become a common pitfall in surgical practice. We must constantly remind ourselves that a certain irreducible risk accompanies each transfusion, and this risk must be weighed against the potential gain to the patient. The mortality for a single blood transfusion has been variously listed by modern authors in large series of cases to be from .07 to .2 per cent. Most fatalities are due to hemolytic transfusion reactions, and most of these, of course, are laboratory errors in typing and cross-matching. In addition to the mortality risk, however, the less fatal complication of homologous serum hepatitis is a frequent occurrence. In spite of its low mortality, this disease causes protracted illness in the postoperative convalescent.

In our mechanistic society, medicine is becoming increasingly involved with strange and wonderful machines of all types. These have added greatly to our understanding and care of the patient. There is a dangerous tendency, however, to become unduly dependent on these mechanical aids. An intern may order extensive laboratory work and a multitude of x-ray examinations before taking a history and doing a physical examination. This undue dependence upon laboratory aids is the last pitfall I would like to point out. The medical student is amazed when we fail to operate on a patient who has every chemical indication of obstructive jaundice and is equally shocked when we perform a cholecystectomy for gallstones in a patient who has had a normal cholecystogram. Certainly, these cases are the exception, yet we must constantly remind ourselves that such things as clinical chemistry and x-ray examinations are no substitutes for clinical acumen.

Of course, I have mentioned only a few of surgery's many pitfalls. I have discussed some of the problems which seem important to me. I would like to close with the plea that the important thing for us in surgery today is to maintain our resiliency—our ability to depart from dogma, custom, tradition, and habit when the evidence so dictates. This does not mean grasping enthusiastically at every undocumented thought, but to keep abreast of the rapid progress which continues to be the heritage of surgery. For each new procedure or agent appearing on the surgical horizon we must ask ourselves the question for which A. J. Carlson is so well remembered, "Vot iss de effidence."

Diagnosis and Treatment of Gout

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THE TWO PHASES of this malady that will be presented have been selected after due consideration. A recognized deficiency persists in the diagnosis of gout in the early stages, and much remains to be done in the dissemination and assimilation of knowledge regarding the proper treatment of this disease.

The diagnosis during the acute phase as well as in the period between attacks rests heavily upon the characteristics of the acute episode. Nor is a diagnosis of gout justified until after the first attack of acute joint distress. The sudden onset of joint distress is typical of acute gouty arthritis. Maximum intensity may be reached within a few hours. The cardinal signs of inflammation are observed. Erythema, swelling, pain, and heat in the peripheral joint or joints of a male should raise strong suspicion of gout. Precipitating agents may include direct trauma, a nonarticular infection, dietary indiscretion, emotional distress, or parenteral administration of any of a number of drugs. In many instances, however, neither the patient nor the physician is successful in identifying the precipitating agent. The metatarsal-phalangeal articulation of the great toe is the most susceptible structure, although other articular surfaces of the feet, ankles, elbows, knees, and wrists may be affected. The age of onset of the first attack usually is within the fourth or fifth decade of life. In a few instances, the first attack has occurred in the teens and, in even rarer instances, it has been delayed until the ninth decade of life.

This is a familial disease and any patient suspected of suffering from gout should be questioned regarding the family history. A positive answer may not be forthcoming at the initial examination, but as time passes a majority of patients discover that some member of the family is similarly afflicted. Males are susceptible in the ratio of 20:1 over females.

The concentration of uric acid in the serum is an excellent diagnostic aid in spite of the fact that the determination of this constituent offers

considerable difficulties in some routine biochemical laboratories. The procedure is associated with more technical difficulties than many of the other routine determinations. Unless the experience of those in the laboratory has been consistent, the value of a single uric acid determination may be of little diagnostic help. Information is particularly important regarding the administration of antiarthritic agents, such as salicylates, prednisone, ACTH, and phenylbutazone, during the twenty-four- or thirty-six-hour period prior to collection of blood for the determination. Any of these agents may have been taken either with or without medical advice and may decrease the concentration of uric acid in the serum with resultant equivocal findings. A reliable value is achieved only if the laboratory is qualified from experience to perform such a determination and if the patient has received no antiarthritic agent immediately prior to the collection of blood. Even under such controlled circumstances, an elevated uric acid does not invariably mean gout. For reasons not entirely clear, the concentration of uric acid in the serum may be within the gouty range in individuals who have other types of joint disease. In some individuals without any subjective joint distress, the uric acid may be elevated. The concentration of uric acid in the serum, therefore, should be used to confirm a suspected diagnosis of gout, not to make a diagnosis on the basis of this finding alone.

The response to colchicine is of diagnostic as well as therapeutic value. Any patient suspected of suffering from gout should be given a therapeutic trial. Colchicine exerts little or no analgesic action upon other types of articular distress. On the other hand, the several other antirheumatic agents may be of therapeutic value but are endowed with no diagnostic implications. The finding of subcutaneous tophi and characteristic roentgenographic changes are not to be anticipated in most patients at the time of the first attack of acute gout or during the earlier

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years of the disease. If x-ray changes are present, such as the punched-out areas of bone adjacent to articular spaces, the disease has probably been present for several years, a number of acute attacks have occurred, and diagnosis should be readily established. It should be noted also that punched-out areas in the bone occur sporadically in other types of joint disease, particularly rheumatoid arthritis.

There are three noteworthy ancillary aids in the diagnosis of gout. A number of patients with this malady have albuminuria, mild hypertension, and urinary tract calculi either individually or jointly. Frequently a case of gout is discovered in a patient in whom one or more of these abnormalities have been present before the first attack of acute joint distress. An example may illustrate this point. A patient in our series with a strong family history of gout passed a uric acid calculus ten years before the first attack of acute arthritis. He has also passed stones in recent years even though the joint distress has been well controlled. Another patient was refused life insurance at a normal premium because of the presence of albumin in the urine. Several years later, the first attack of gout appeared. This patient also was a member of a family with a history of gout.

The significance of hypertension in gout justifies elaboration of this subject. Approximately one-third of the patients with this malady in our series have an elevated blood pressure. With but one exception, I have not seen malignant hypertension develop in any patient.

The diagnosis of gout in the intercritical period, that is, the period between the acute attacks, should offer no great difficulty. The patient usually remembers the vivid details of the articular distress, and his description may be as helpful as direct observation. The other facets of diagnosis are similar to those observed during the acute episode.

The treatment of the acute attack of articular distress involves general as well as specific measures. Colchicine by mouth continues to be the drug of choice. In recent years, other drugs have been reported to be superior, but additional clinical experience is required before I will be willing to recommend the abandonment of oral colchicine for the acute attack. Early administration is a vital requisite. The patient should have colchicine available at all times in order that this drug be started with the appearance of the first twinge of pain in the joint. Either the tablet or the granule of colchicine, 0.5 or 0.6 mg., is to be taken orally. Ingestion of 2 doses every two hours or 1 dose every hour should become

routine until satisfactory relief of joint pain is noted or until the onset of gastrointestinal distress occurs. If the attack proves to be mild, not more than 4 or 5 tablets are required, and gastrointestinal distress is not provoked. If the attack is moderate or severe, ingestion of colchicine is to be continued without interruption, irrespective of the time of day or night, until gastrointestinal distress appears. The average dose for the person of medium weight is 10 tablets. When nausea, vomiting, or diarrhea develops, colchicine should be stopped and a gastrointestinal sedative given. A dose of 5 cc. tincture of camphorated opium (paregoric) may be administered and this dose repeated every two hours until these side actions disappear. The subsidence of articular distress usually occurs promptly.

The above description has been identified as a "full course of colchicine" and is most helpful when followed specifically. Optimum benefit from oral colchicine is not achieved if the full course is interrupted. This applies particularly to the fallacy of giving a few pills on one day and completing the "course" the following day. Under such circumstances, gastrointestinal distress may appear without the beneficial effect upon the joints.

Considerable variation from this specific regimen has been recommended by other clinics under the supervision of competent rheumatologists. Other agents that have been recommended for the treatment of the acute attack include salicylates, the adrenal steroids, phenylbutazone, Colcemide, and intravenous colchicine. Each of these preparations individually or in combination with oral colchicine has been tried experimentally in our clinic. Sometimes the results are as satisfactory as may be expected with oral colchicine only; in other instances, the results are less spectacular. In a limited number of cases, I have not found that Colcemide is superior to colchicine. A similar statement may be made in regard to the combined use of one of the adrenal steroids and suboptimal amounts of oral colchicine. The combination of phenylbutazone and oral colchicine has a better record. For a severe case of acute gouty arthritis, 2.5 mg. of oral colchicine in divided doses and 800 mg. of phenylbutazone in divided doses over a period of six to eight hours usually results in satisfactory remission. My conservative use of phenylbutazone is based upon the dire side effects of this preparation when used continuously over a period of time. Colchicine, on the other hand, has an extremely low toxicity record and is believed to be safe in the hands of the patient

when a physician is not readily available. This statement does not do justice to clinical experience. The vast majority of patients with gout in my series are instructed to take additional amounts of colchicine for acute symptoms without seeking medical advice and are authorized to vary the dose, depending upon circumstances, just as a patient with diabetes mellitus may alter his insulin intake. Intravenous colchicine is of advantage in selected instances. Patients whose gastrointestinal tract has a low threshold of tolerance for the drug may experience excellent results when a portion of the total colchicine requirement is administered parenterally.

Over and above these qualifications, the most important use of these adjunctive antigout preparations is in the treatment of longstanding, inadequately managed acute gouty arthritis. A patient may have had acute distress for days or even weeks without a proper diagnosis having been made. At other times, a suboptimal amount of colchicine may have been taken and only partial relief followed. Usually an acute attack is more difficult to treat after a lapse of twenty-four hours or more of acute distress than if treatment had been started during the first few hours of symptoms. At such a time, oral colchicine may be combined to advantage with one of the several agents enumerated.

General measures for the treatment of the moderate or severe attack of gout include rest of the affected joints, abundance of fluids, and a light diet. If an upper extremity is involved, an arm sling suffices; if the lower extremities are affected, bed rest with a cradle for bed covers is desirable. Severely afflicted joints are susceptible to minor cutaneous stimuli. The local application of moist dressings, dry heat, ice packs, diathermy, ultraviolet radiation, supersonic radiation, and infraradiation, respectively, have been recommended but are of doubtful value in our opinion. The systemic reaction to a severe attack of gout is not fully appreciated. A fever from 2 to 5° F. may be present which confuses the inexperienced physician as well as the patient. Obviously, other causes of febrile reaction should be excluded but not to the point that the acute gout is overlooked. Chills and leukocytosis may accompany the fever. If fever is present, a high fluid intake is particularly important. This aids in the renal transport of uric acid and minimizes the tendency to precipitation of urates in the renal tubules.

Although the mechanism of acute articular distress in gout is not understood, synovial effusion may be a precipitating factor and reaches clinical proportions if the knee is involved. Periodic

inspection should be made of this joint in order to determine whether or not an effusion of an appreciable size is present. Excess fluid should be removed if the suspicion is confirmed. An elastic bandage should be applied after removal of fluid and worn for two or three days. The time for recovery of the affected joint may be prolonged if aspiration is not accomplished. Aspiration is an adjunct to drug therapy and does not replace it; the antigout agents selected should be continued quite independently of this procedure.

Irrespective of the regimen selected for the treatment of the acute attack of gout, the patient should be rehabilitated as rapidly as possible. Activity should be encouraged and the affected joint used as soon as distress subsides. The more rapidly normal function is obtained, the better the clinical results.

Patients with a mild form of the disease, as well as those more severely afflicted but who respond well to the gouty regimen, should be incapacitated by an acute attack at infrequent intervals only. A majority of the total number of patients with gout seen in this clinic are incapacitated by acute attacks of gouty arthritis on not more than a few days each year. Patients with a mild form of the malady, irrespective of specific therapy, may experience an attack at less frequent intervals. Also, some patients, without benefit of specific therapy, experience frequent attacks of acute gouty arthritis over a period of several years and subsequently notice a significant diminution in frequency. The "classical course" of the disease that is described, with increasing frequency of attacks and increasing joint involvement, is by no means the inevitable clinical course. The malady is variable and the progression or lack of progression in an individual patient need not follow a characteristic pattern, which makes a specific or a nonspecific regimen in long-term management difficult to evaluate. I am convinced that much may be accomplished by carefully following a gouty regimen. I am equally willing to admit that what appears to be of clinical benefit may be a function of the inherent aspect of the disease in a few selected individuals.

Just as colchicine is considered to be the drug of choice in the treatment of the acute attack, it is also the antiarthritic drug of choice in the intercritical period. Although there is no satisfactory explanation for the pharmacologic action of colchicine upon the gouty joint, the empiric use of the drug is endowed with great merit. Colchicine has been prescribed by us as a prophylactic agent for more than two decades, and,

as of 1956, I have not yet used a drug that I believe is less toxic and superior as a prophylactic preparation.

Most patients with gout are advised to take colchicine periodically in the intercritical period. If the affliction is mild and the patient has not had more than one attack per year, 1 tablet (0.5 mg.) is recommended three or more days each week. Patients moderately afflicted should take 1 or more colchicine tablets each day of the year. The severely afflicted should begin taking 2 tablets per day and increase to 3, if no gastrointestinal intolerance appears. A few patients may require as many as 4 tablets daily. The precise number in this range should be determined by the gastrointestinal tolerance of the patient as well as by articular benefit. A period of six to twelve months should be used as a baseline for subsequent comparison. After a year at an established intake of colchicine daily, the amount may be reduced by 1 tablet per day on a trial basis. A minimum of six months should be established for comparative studies. If the patient remains attack-free and distress-free at a lower level, adherence to the new dosage is permissible. We believe that no patient with moderate or severe gout should go without colchicine for any length of time.

Intolerance to colchicine during the acute attack of arthritis has not been observed even though the patient has been on periodic prophylactic doses. Patients who have been on daily rations of colchicine for a decade or more receive the optimum benefit from a "full course" when this is prescribed. Another obvious gain from the daily ingestion of colchicine for those moderately or severely afflicted is the advantage in having started a course at an early stage of an attack, if acute articular symptoms develop.

Colchicine is believed to be the agent of choice in preventing acute articular distress but, as noted previously, it is endowed with no metabolic effect upon the disturbance of uric acid. During the past six years, a new drug, Benemid, has been available which has demonstrated its value as a uricosuric agent of low toxicity. Benemid increases the excretion of uric acid from the body but directly is of no value in combating acute articular distress. Its merit is exclusively in its uricosuric action, which occurs concomitantly with depression of uric acid in the serum. The action of Benemid is presumed to reside in the renal tubules where the transport of uric acid occurs. Experimental evidence suggests that uric acid appears in glomerular filtrate in essentially the same concentration as it appears in a protein-free filtrate of serum. Approximately 10

per cent of the uric acid is excreted in bladder urine; the remaining 90 per cent is reabsorbed in the tubules. Any decrease in the percentage reabsorption of uric acid from glomerular filtrate would result in an increased urine clearance and an increased urinary excretion of this substance. Benemid lowers the serum uric acid level by 30 per cent or more and increases the excretion in the urine by a similar amount. The action of Benemid upon the urate in the serum and the excretion in the urine may be demonstrated within six hours after the drug is taken. A maximum effect upon the concentration of uric acid in the serum, with maintenance doses of 2 gm. per day, may be observed within a fortnight after administration of Benemid. Thereafter, the effect in the serum diminishes slightly, but it is not abolished and in most patients the uricosuric action may be demonstrated as long as the drug is continued. In our series, this duration now has extended to six years.

The optimum dosage of Benemid may be determined by the gastrointestinal tolerance of the patient. Most patients do not tolerate more than 2 gm. of Benemid daily for more than a few days. Several of the gout patients we have seen have been maintained on 2 gm. of Benemid daily throughout the duration of the study. A majority, however, average 1 gm. of the drug daily. In patients severely afflicted, the larger dose results in greater mobilization of uric acid deposits from the bone and subcutaneous spaces. In patients moderately afflicted, the need is not as great and the smaller doses are effective in combating the increased formation of uric acid by the body.

Most of the patients who are moderately or severely afflicted with gout should be on daily rations of Benemid in addition to colchicine. There may be little justification for recommending Benemid daily to those mildly afflicted unless the serum uric acid level is high. Patients moderately or severely afflicted who have been stabilized rather well on prophylactic colchicine report at least two beneficial effects of Benemid, that is, a reduction in the incidence of acute attacks per year and an improved state of well-being. These reports have been confirmed on several later occasions. By stopping Benemid, vague symptoms returned and when medication was subsequently resumed, the previous state of well-being was restored.

The toxicity of Benemid is believed to be unimportant clinically. Apprehension regarding the development of toxic symptoms decreases, the longer Benemid is used. The side effects that have been reported include the tendency to pass

uric acid calculi, gastrointestinal irritation, genitourinary irritation, skin rash, and an anaphylactic reaction. The only toxic reactions that merit elaboration are the urate calculi and the anaphylactic reactions, since the other phenomena subside promptly with cessation of the drug or with the ingestion of the drug at mealtime. The incidence of uric acid stones in patients with gout was appreciated before the discovery of Benemid. Some patients with gout have passed uric acid stones before the first attack of articular distress, as noted previously. In the patients in our series, this disorder does not appear to have occurred with greater frequency during the past five years than before Benemid was discovered.

Since Benemid leads to a significant increase in uric acid excretion in the urine, every effort should be made to avoid precipitation of urates into the tubules. An abundant fluid intake should be stressed, irrespective of the administration of this drug, since the solubility of uric acid in the urine is critical. As large a urine volume as possible should be achieved. The advantage of an alkaline urine in increasing solubility of urates is obvious theoretically. Some physicians recommend 2 to 3 gm. of sodium bicarbonate in divided doses as an alkalizing substance. We have seldom recommended this.

The ultimate value of Benemid is rapidly being recognized. Recalcification of osseous tophi is objective evidence that is particularly encouraging. Regression in subcutaneous tophi is relatively slow and sometimes difficult to evaluate, since a portion of the swelling in the tophus is caused by nonurate substances, and tophi fluctuate in size from time to time without a satisfactory explanation. If Benemid is able to restore the concentration of uric acid in the serum to or toward the normal range, there must be a reverse migration of uric acid from articular and subcutaneous deposits to the pool of uric acid in the body and loss from the body by way of the kidneys. Since uric acid probably takes years to be deposited in macroscopic quantities in and about the joints, a prolonged period is necessary to achieve a reversal. No means are presently available to determine whether uric acid is completely reabsorbed from tophaceous deposits. Superficial inspection of the joint as well as roentgen examination provide incomplete evidence only. Undesirable effects from disruption of the electrolyte equilibrium associated with prolonged Benemid therapy have not materialized. The long-term action appears to be upon the transport of uric acid only and upon no other important phase of metabolic activity.

Dietary control of the gouty patient in the

intercritical period continues to be a subject for disagreement. The total caloric intake should be carefully regulated so that the patient is maintained in a state of optimum nutrition, neither over- nor underweight. The relative content of carbohydrate, protein, and fatty foods furnishes the principal realm for discussion. Avoidance of a high-fat diet is indicated. The harmful effects of purine foodstuffs have been noted for more than a century. This was based primarily upon the presumption that purines and proteins were the sole precursors of uric acid. Studies in recent years, chiefly by means of isotopes, have revealed that relatively simple biologic substances may contribute to the uric acid molecule. These simpler biologic substances include carbon dioxide, formic acid, glycine, and lactate. Obviously, carbohydrates and fats may be the source of some of these simpler biologic compounds as well as proteins and purines. A diet low in purines but balanced in regard to carbohydrate, proteins, and fats is a suitable compromise for gouty patients, if other phases of the gouty regimen are maintained. Furthermore, a better over-all result occurs if proteins are allowed than follows a rigid restriction of proteins and purines.

Substances high in purines, such as liver, kidneys, sweetbreads, and anchovies usually can be omitted without hardship. A liberal portion of red meat or fowl may provide some additional nucleotides as precursors of uric acid, but we believe that the harm is more theoretical than real. With the availability of a powerful uricosuric agent, there is less justification for protein restriction than formerly. Purine restriction should be maintained even though Benemid is administered.

An abundant intake of water is highly desirable. Since the concentration of uric acid in body fluids and glomerular filtrate is near the saturation level, the tendency to precipitation of urates in the tubules during resorption of fluids, which is greater than the per cent resorption of urate, is a potential threat. Any measure which minimizes this threat should be enforced. Fluids with caloric supplements, such as milk or soft drinks, should be kept at a minimum if the patient tends to gain weight. A high-fluid intake in the evening should not be insisted upon if it promotes nocturia. The harm from a temperate intake of alcoholic beverages is difficult to assess. An occasional patient may furnish satisfactory evidence to indicate that a particular beverage acts as an inciting agent for acute gout. Most patients with gout, on the other hand, are able to remain symptom-free while enjoying a tem-

perate amount of alcoholic beverages if other antigout measures are followed.

Until the time when unsightly tophi can be prevented or a uricosuric agent can resorb subcutaneous and osseous tophi rapidly, surgical interference will comprise one aspect of therapy. The surgical treatment of selected patients with chronic tophaceous gout is gratifying. The feet, hands, and elbows comprise the sites that may require surgery. Large subcutaneous tophi which have become unsightly or small tophi of the hands or feet which interfere when gloves or shoes are worn should be removed. Painful tophi in exposed areas of the body, such as about the olecranon bursa, the terminal phalanges of the fingers, toes, and heels, or the lateral aspects of the feet may be unsightly, painful, or the site of a draining sinus. Tendinous involvement by tophi may interfere with motion or locomotion and should be removed surgically. If the lesion is approached surgically, urates should be removed as completely as possible by curettage. Although extensive tophaceous deposits eventually may prove to be susceptible to removal medically by uricosuric agents, a more rapid rehabilitation by surgical means is the most practical solution currently available. The hazards from surgical interference are negligible. The possibility of postoperative gout necessitates pre- and postoperative medication with colchicine, as noted previously. Gouty joints are not prone to infection, and, even before the days of antibiotics, postoperative infection was not a problem. The incision heals satisfactorily, and the patient as well as the physician is usually pleased with the results.

SUMMARY

The diagnosis of acute gouty arthritis is based upon the cardinal signs of inflammation of one or more peripheral joints in a male. The response to colchicine is of therapeutic as well as diagnostic value. Roentgenographic changes in the joints and subcutaneous tophi usually are not present in the early years of the disease. Ancillary diagnostic aids include a positive family history, presence of albuminuria, rise in blood pressure, and passage of uric acid calculi.

Oral colchicine continues to be the drug of choice in the treatment of the acute attack. Combinations of oral colchicine with the adrenal steroids, salicylates, phenylbutazone, Colcemide, or intravenous colchicine may have merit in selected instances.

Two drugs of low toxicity are preferred in treatment during the intercritical period. Colchicine is of value prophylactically in preventing attacks of acute distress; Benemid is a powerful uricosuric agent which aids in eliminating uric acid from the body. Limited amounts of colchicine and Benemid should be taken daily by all patients moderately or severely afflicted with gout. Avoidance of obesity and restriction of foods containing purines and fats are desirable. A liberal daily portion of protein is permitted. A high-fluid intake is stressed. The prognosis is favorable in most patients, and a conviction of optimism should be conveyed at all times.

Some of the researches described have been supported in part by Grants-in-Aid from the western New York Chapter of the Arthritis and Rheumatism Foundation and from the National Institute of Arthritis and Metabolic Diseases, Bethesda, Maryland.

SPASM of voluntary muscles can be relieved with zoxazolamine (Flexin). Control of stiffness makes rehabilitation exercises easier and shortens the period of recovery from rheumatic disease.

Richard T. Smith, M.D., Kenneth M. Kron, M.D., William P. Peak, M.D., and Irvin F. Hermann, M.D., Pennsylvania Hospital, Philadelphia, found that oral administration of 250- to 500-mg. doses of the drug three or four times daily relieved muscle spasm in 85 of 100 patients with rheumatic disease. Results were best with rheumatoid spondylitis; 15 of 16 patients were benefited. In some instances, posture was improved so that the patient could stand erect. Flexin was nearly as effective for localized or general fibrositis; stiffness was decreased in 30 of 34 patients. Time required for stiffness to vanish after a period of inactivity was reduced by 50 to 75 per cent. Patients with the cervical root syndrome or rheumatoid arthritis were also benefited by Flexin therapy.

Most common toxic effects were gastrointestinal symptoms and disturbances of equilibrium. In 13 patients, side effects were severe enough to warrant discontinuance of therapy.

RICHARD T. SMITH, KENNETH M. KRON, WILLIAM P. PEAK, and IRVIN F. HERMANN: J.A.M.A. 160:745-748, 1956.

Present Status of Cardiac Rehabilitation

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INTEREST in what today is called "Rehabilitation of the Cardiac Patient" first became apparent at least forty years ago, and some of the early activities in this field are described in an article published in 1949.¹ Among the earliest ventures was a Trade School for Cardiac Convalescents which was operated in New York City from 1913 to 1916. The experience of this school led its staff to the conclusion that "In many cases patients do not require a long period of convalescence, but can begin suitable work after short convalescence and sometimes immediately after leaving the hospital."² The same group also concluded that "It was certainly demonstrated that cardiac patients have a greater work tolerance than they were at first thought to have."²

In 1918, the Hospital Social Service Association of New York City established an Employment Bureau for the Handicapped. Between April 1918 and November 1922, this bureau placed 1,039 cardiac patients in regular industry. A few of these patients were followed for about a year and responded favorably. What became of the Employment Bureau for the Handicapped after 1922 is not known, but, about ten years later, service to the handicapped became a regular function of employment services operated by the states.

One of the great statesmen of cardiology, Dr. Paul D. White of Boston, wrote in 1921, "Heart disease and industry are not incompatible" and also "In general, we have been inclined to shelter too much our young patients with heart disease. They can usually do more than we have permitted."³ In the light of recent observations, Dr. White's views on the *young* cardiac patient can be said to apply also to the older person with heart disease.

An article by Stein and Baron, published in 1923,⁴ and another by Lincoln in 1924⁵ clearly enunciated the major principles which serve as

a guide today in the placement of cardiac patients. For example, Stein and Baron state:

1. "It is possible for many cardiacs to work. In fact, they are usually better at work than when idle.

2. "To rehabilitate cardiacs successfully . . . we need a specialized vocational advisement bureau which will act in cooperation with heart specialists . . . (and) insist on a classification of all patients.

3. "Employers must be educated to the fact that cardiacs may be useful workers if they are not exceeding their physical strength."

Similar ideas were expressed by Miss Lincoln, a social worker in 1923, but today Miriam Lincoln, M.D., of Seattle, Washington, namely: that the cardiac should work, the cardiac can work, industry has a place for the cardiac, and, finally, that "the better adjustment of the interests of the cardiac and the industry may be attained by, education for suitable and remunerative work, by vocational guidance, and *by making professional, medical, social, and industrial counsel available for the protection of the handicapped worker and his employer.*" (Italics ours.)

Other significant contributions were made prior to 1930.⁶⁻⁸ In 1935, Dr. William D. Stroud of Philadelphia published an article⁹ in which he described a study of the placement of cardiac patients in employment, which had been carried on from 1926 to 1932. During this period, a total of 280 heart patients were placed in employment and 22 in training. Although no follow-up observations are recorded, Dr. Stroud expressed the opinion that many individuals with heart disease can safely be employed. He emphasized the importance of proper functional classification and pointed out the role which must be played by the physician, the social worker, the placement counselor, and the rehabilitation worker. An excellent article entitled "The Employee with Heart Disease—His Management in Industry," by Crain and Missal,

Presented at the annual meeting of the Ohio State Heart Association, Cincinnati, April 22, 1955.

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was published in 1938.¹⁰ This was the first of several important contributions from the medical department of Eastman Kodak Company.^{11,12}

A highly significant study of occupational activity after acute coronary artery occlusion was reported by Master and Dack in 1940.¹³ Their observations covered a total of 415 patients, most of whom were between 40 and 70 years of age. Of these patients, 80 were followed for five years or more. More than half of the patients returned to full- or part-time work, and, according to the authors, the work did not aggravate symptoms they may have had nor predispose to further attacks of coronary occlusion or heart failure.

Some of the more significant articles which followed this report are listed in the extensive bibliography quoted by Kaufman and Becker¹⁴ and in a more recent report by Master and associates.¹⁵ Most of these articles stress the fact that many persons with heart disease can safely be employed and that a large proportion can return to their former jobs after a coronary occlusion.

PRESENT CONCEPT OF REHABILITATION

As mentioned previously, the term "rehabilitation" was applied to the management of cardiac patients more than forty years ago.¹² After World War II, largely through the outstanding work of Dr. Howard Rusk and the interest of Mr. Bernard Baruch, "rehabilitation" has been widely popularized. Generous grants from Mr. Baruch have enabled a number of medical schools to establish institutes or departments of physical medicine and rehabilitation. The name of these institutes indicates their major orientation toward orthopedic and neurologic handicaps. The terms "physical medicine" and "rehabilitation" have been used almost as synonyms in many places. While such usage may be proper when dealing with orthopedic and neurologic disorders, it is totally incorrect in connection with heart disease.

It is, or should, be self-evident that "rehabilitation" is inherent in good medical care. As applied to heart disease the term includes a correct diagnosis, carrying out proper medical and surgical therapy, handling social and emotional problems that may be troubling the patient, detailed advice as to daily living, and appraisal and guidance in relation to employment. All of these aspects are the responsibility of the family doctor. Assistance from specialized workers outside the medical profession may be desirable and in some places is available, but the physician who regards "rehabilitation" as somebody else's job rejects the tenets of good medical practice.

The quotations previously cited in the introductory section were chosen advisedly to em-

phasize particularly the need for social and vocational guidance when handling cardiac patients. Some physicians may be able to provide such help as well as supply the purely medical needs. In actual practice, however, very few physicians are able to take the time required, even if they possess all the necessary talents. At least one practical method has been found for helping physicians meet the employment problems of cardiac patients. This is the Work Classification Unit.

WORK CLASSIFICATION UNITS

The first so-called Work Classification Unit for cardiac patients was established at Bellevue Hospital, New York City, in 1941 and is now in its fifteenth year of operation. It was called a "Unit" because it was a part of a general cardiac clinic. The qualifying terms "Work Classification" were used since a major objective of the unit was to classify patients in terms of the work for which they were suited. "Prescriptions for work" have been the only form of therapy dispensed.

The specific stimulus which led to the development of the first Work Classification Unit came in the form of a request to the New York Heart Association from the New York State Employment Service for assistance in securing the kind of medical information on cardiac patients that was necessary for suitable placement. The physicians who organized the unit recognized that, in addition to the purely service function, opportunities would be afforded for research of a much-needed type. In particular, they set out to seek answers to two basic questions. First, what types of occupation are best suited to persons with heart disease? Second, what effects do various occupations have on the course of heart disease? It was predicted that a period of perhaps twenty years would be required to secure answers to these questions. In a series of publications starting in 1944, important but limited observations have been reported from the unit.¹⁶⁻²³

Although the initial purpose of the Bellevue Work Classification Unit was to help unemployed persons with heart disease find suitable jobs, the passing of time brought to light other functions. Prominent among these is providing advice and guidance in returning to work employed individuals in whom heart disease develops.^{24,25} An important corollary to this function is sharing responsibility with the family doctor or personal physician when a decision must be made on the question of return to work. Another related function is that of serving as an unbiased arbiter when the matter of returning

an employee to work results in differences of opinion between the personal physician, the industrial doctor, and perhaps the trade union representing the worker.

Up to 1955, the original Bellevue Work Classification Unit has served as a prototype for about 40 similar units or clinics, as listed in table 1. The fact that nearly ten years elapsed before the second unit was established in this country, by Dr. Herman K. Hellerstein in Cleveland, Ohio, meant that Bellevue's considerable experience could be made available to others. The Bellevue group was consulted by many of those who were planning new work classification units or clinics. In recognition of the widespread interest in this type of activity, the American Heart Association held, in October 1954, a two-day conference for the key personnel of work classification units from all parts of the United States. Previously, the association had published a manual²⁶ to guide those who were considering the organization of a new work classification program. This manual contains a number of warnings and admonitions which apparently have not always been heeded, since a few units have been obliged to suspend operations after a short period of activity. Other units have encountered difficulties which might have been avoided had they paid more attention to planning and executing their first steps, particularly in determining the need and acceptability of the unit in the community.

The American Heart Association is prepared to give valuable guidance to those who may be considering the establishment of a unit.

SHELTERED WORKSHOPS

It has long been recognized that there are many persons whose physical handicaps are so severe that for them any form of employment in a competitive labor market is virtually impossible. In some cases, the disability is such that complete bed rest or minimum activities of daily living are all that can be tolerated. For others, limited vocational efforts in a sheltered environment are possible, and for these individuals the sheltered workshop has been created.

A review of all sheltered workshops is beyond the scope of this article. Many rehabilitation centers operate workshops in which the clients engage in or are trained for productive occupations and a number of these accept cardiac cases. One of the objectives of these centers is to develop increased "work tolerance" in their trainees. In other sheltered workshops, graduation to outside employment appears to be a by-product rather than the chief objective of the program.

Significant pioneering work has been done at

TABLE 1
CARDIAC WORK CLASSIFICATION UNITS

1941	New York City, Bellevue Hospital
1947	*Manchester, England, Royal Infirmary
1950	Cleveland, Cleveland Rehabilitation Center New Haven, Connecticut, New Haven Hospital
1951	Pittsburgh, Falk Clinic Milwaukee, Veterans Administration Hospital New York City, University Hospital Newark, New Jersey, St. Michael's Hospital
1952	Philadelphia, Philadelphia General Hospital Baton Rouge, Louisiana, Esso Standard Oil Company Springfield, Massachusetts Denver, Denver General Hospital Boston, Massachusetts General Hospital New York City, Beekman Downtown Hospital Newark, New Jersey, Beth Israel Hospital Brooklyn, New York, Methodist Hospital *New York City, Hospital for Joint Diseases *Rocky Mount, North Carolina
1953	Alameda, California, Highland Hospital Harrisburg, Pennsylvania Kansas City, Missouri Portland, Oregon Middletown, Connecticut Corpus Christi, Texas
1954	Seattle, Washington Baltimore, Maryland Chicago, Chicago Rehabilitation Institute Metuchen, New Jersey, Roosevelt Hospital Los Angeles, California San Francisco, California Rochester, New York
1955	Jamaica, New York, Jamaica Hospital
OPENING DATE UNKNOWN	
	Stamford, Connecticut St. Petersburg, Florida Indianapolis, Indiana Westchester County, New York, Grasslands Hospital Erie, Pennsylvania Scranton, Pennsylvania, Hahnemann Hospital Washington, D.C.

*Discontinued

the Altro Workshops, Inc., in New York City. Altro is a sheltered workshop which has been concerned for more than forty years with the rehabilitation of tuberculous patients by training them in some of the needle trades, always under close medical supervision. In 1947, a limited number of cardiac patients were accepted on an experimental basis to see in what way work tolerance could be increased. A study of the results has revealed that by means of a graduated work program, medically supervised, individuals with heart disease show a rather rapid increase in their ability to work. This improvement is not necessarily the result of increased cardiac reserve alone, but may be due to the elimination or diminution of psychogenic factors, particularly those arising from fear. The Altro experience is of the greatest importance for, among other things, it points the way to another very practical approach to cardiac rehabilitation.^{27,28}

THE HOUSEWIFE

A study published in 1944¹⁶ drew attention to some of the problems of the housewife who is afflicted with heart disease. Among other things, many, if not most, housewives were found to continue their usual occupational activities even

when advanced heart disease is present. An important step toward lightening the burden of the cardiac housewife was taken by the New York Heart Association in 1947. The so-called "Heart of the Home" program was conceived by Miss Martha Ashcraft, now Mrs. William Fingerle of Greenwich, Connecticut, of the New York Heart Association staff, and its focal point was a model kitchen designed to reduce the amount of physical effort required to perform usual kitchen activities. The design itself was largely the work of Dr. Lillian Gilbreth, renowned industrial engineer and author of "Cheaper by the Dozen."

The idea of work simplification for the cardiac housewife received an enthusiastic reception in all parts of the United States and in several countries abroad. Replicas of the original labor-saving kitchen have been constructed elsewhere and used for demonstrations and actual classes. Thousands of pamphlets describing work simplification methods in the home have been distributed. One of the most popular features among the activities of state and local heart associations today is the Heart of the Home Program.²⁹

THE FARMER

Most recent of the occupational groups to receive serious attention from the point of view of "rehabilitation" is the farmer. It was logically reasoned that if methods of work simplification could be applied in the home and to the advantage of the housewife, a similar approach might be applied to the farmer. In the latter case, the problem might be somewhat more complex, but the underlying principles were similar.

The most important work related to the problems of heart disease among farmers is that being conducted at Purdue University in Indiana under direction of L. S. Hardin, M.D., M. X. Zarrow, M.D., and W. H. M. Morris, M.D. The studies are being financed for five years by a grant of \$130,000 provided by the Indiana Heart Foundation, the Indiana State Board of Health, and Purdue University.³⁰ A description of the objectives and procedures was presented by Dr. Morris at the annual meeting of the Ohio State Heart Association in Cincinnati in April 1955.³¹

GOVERNMENT ACTIVITIES

The fact has already been mentioned that the New York State Employment Service stimulated formation of the first cardiac Work Classification Unit in 1941. Ever since that time, employment services in many states have maintained an active interest in cardiac rehabilitation programs. Similar and perhaps greater interest has been shown by some of the state divisions of voca-

tional rehabilitation. These agencies have been instrumental in referring patients to Work Classification Units, in helping the units secure jobs for cardiac patients, and in providing services of a vocational counselor in some of the units.

In 1951, the Federal Office of Vocational Rehabilitation, under the able leadership of Miss Mary Switzer, agreed to join forces with the American Heart Association in the attack on problems of rehabilitation relating to heart disease. The appointment of the chairman of the American Heart Association's Cardiac-in-Industry Committee as consultant to the Office of Vocational Rehabilitation greatly facilitated the implementation of a productive joint program.

Participation of the Indiana State Board of Health in the Purdue University studies mentioned before is only one example of public health agency interest in cardiac rehabilitation. In Pennsylvania, the State Department of Health has given and is continuing to give substantial financial support to several Work Classification Units in that state. The New Jersey State Health Department has stimulated interest in Cardiac-in-Industry programs, and, undoubtedly, activities have been similar in other state and local health departments. The United States Public Health Service has made funds available through the National Heart Institute for research studies of cardiac function in relation to the physical demands of various occupations.

Of particular interest at the present time is the Vocational Rehabilitation Act of 1954 (Public Law 565). This law was not specifically aimed at rehabilitation of the cardiac patient, but by expansion of all types of rehabilitation services, training and research, he will certainly be helped.

MEDICOLEGAL ASPECTS

The fact that heart disease might entail problems in Workmen's Compensation was recognized as early as 1922.⁷ Relatively little attention was paid to this matter until the late 1940's, but, in recent years, this subject has become a major concern. Today perhaps the most serious obstacle in the path of employment for cardiac patients is raised by the trend toward awarding workmen's compensation benefits to employed persons who develop cardiac disabilities.

In a number of our states, a tendency has appeared for workmen's compensation boards to adopt increasingly "liberal" policies in awarding benefits to cardiac cases. Where decisions have been appealed, the courts have usually sustained decisions in favor of the claimants and, in some instances, have even expressed opinions that mean, in effect, that employment itself is suffi-

cient reason for awarding a person who sustains a myocardial infarct or a related disability.

The subject of workmen's compensation and heart disease is much too involved to permit a complete discussion here. A few studies of the subject have been made and published.³²⁻³⁷

For a number of years the American Heart Association has had a Committee on Strain and Trauma in Relation to Heart Disease which has been devoted to this matter. More recently the association set up a Sub-committee on Workmen's Compensation under the Rehabilitation Committee. Both committees have been working together, and, in May 1955, each received a substantial grant from the American Heart Association for intensified activity. The future success of cardiac rehabilitation programs depends largely on finding a scientifically based, economically sound, socially acceptable, and legally fair solution to the workmen's compensation problem.

RESEARCH

Some of the major fields of research in relation

to cardiac rehabilitation which have already been mentioned are: effects of employment on the course of heart disease, effects of heart disease on ability to work, work simplification in the home and on the farm, effects of strain and trauma, as well as other medicolegal problems. Further investigation in these fields is needed.

Particularly pressing is the need for a method or methods of objectively measuring cardiac function in terms that can be translated into ability to perform safely in a given job. This subject was reviewed by Warren in 1952³⁸ with somewhat negative conclusions. Several excellent investigators are currently attacking this problem,³⁹ which leads to a feeling of optimism for substantial progress in the near future. Increasing public awareness of the importance of research in all phases of cardiovascular disease has resulted in available funds for any reasonably promising research proposal. Until methods of specific prevention have been further developed, attention must be devoted to methods of keeping the cardiac patient at work.

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and Teacher*

By J. ARTHUR MYERS, M.D.

WALTER H. UDE, son of Reverend and Mrs. A. F. Ude, was born in Blue Earth County, Minnesota, March 19, 1896. After graduating from high school at Chatfield, Minnesota, he served overseas in World War I. In December, 1925, he received the degree of Doctor of Medicine from the University of Minnesota. He was a member of Theta Kappa Xi medical fraternity and was elected to Alpha Omega Alpha. After graduation, he spent considerable time in graduate work with Dr. Preston Hickey, University of Michigan, before establishing private practice in radiology in Minneapolis in September 1926.

Dr. Ude served as chief of the department of radiology at Minneapolis General Hospital from March 1931 until February 1942. After resigning in 1942, he was consultant for the remainder of his life. He worked in close association with Dr. Leo Rigler, chief, department of radiology, University of Minnesota, where he was clinical professor. He also headed the work in roentgenology at St. Andrew's Hospital from 1928 to 1953; Eitel Hospital, 1930 to 1945; and St. Mary's Hospital, 1931 to the time of his death. He was counselor in the state of Minnesota for the Radiological Society of North America since 1946, and was elected vice president of the national organization at the 1956 meeting.

As his private practice developed, he established a fine organization. His first associate was Dr. C. N. Borman and, later, Dr. E. E. Ahern and Dr. N. F. Stone. Only two years ago, this group established new offices with equipment second to none in this area.

In addition to holding membership in county, state, and American medical associations, he was a member of the Minneapolis Academy of Medicine,

diplomate in 1934 of the American Board of Radiology, American Roentgen Ray Society, and Radiological Society of North America. He was a fellow of the American College of Radiology.

He published a number of articles on various aspects of x-ray treatment and diagnosis in local journals, including *Minnesota Medicine* and *JOURNAL-LANCET*, as well as national journals, such as the *American Journal of Roentgenology and Radium Therapy*, *Radiology*, and *Journal of the American Medical Association*.

Dr. Ude always manifested special interest in diseases of the chest. He was a member of the Hennepin County and the Minnesota Tuberculosis and Health Associations. In the early 1930's, he devoted considerable time to speaking as part of a team before medical society meetings in various parts of Minnesota, sponsored by the Minnesota Tuberculosis and Health Association and the State Medical Association.

He was deeply interested in good quality x-ray films of the chest. A number of physicians throughout the state owned x-ray equipment, but their films were not satisfactory. Miss Vera Schultz, an excellent technician who headed this work at Minneapolis General Hospital for a time and also in Dr. Ude's private office, was especially well qualified to demonstrate to physicians how to obtain best results from their equipment. He permitted Miss Schultz to travel about the state demonstrating x-ray equipment at the expense of the Tuberculosis and Health Association until the majority of physicians were producing first-class films of the chest. He took pride in inspecting such films.

In 1945, Dr. Ude was appointed to membership on the Committee on Tuberculosis of the Minnesota

State Medical Association and was an exceedingly regular attendant at the meetings through the remainder of his life. During this committee's existence, from 1924 when it was a small liaison group operating between the State Tuberculosis and Health Association and the State Medical Association, later when it was a sub-committee of the Public Health Committee of the State Medical Association, and for the first few years after it became a regular scientific committee, Dr. Ude was the first roentgenologist to hold membership.

Since 1921, the Mayo Clinic had made routine chest x-rays inspections of patients entering the clinic. This practice also applied to Methodist and St. Mary's hospitals in Rochester. In 1933, the Swedish Hospital staff in Minneapolis demonstrated the value of examining all patient admissions and personnel for tuberculosis. The University of Minnesota Hospital, since 1935, and the Minneapolis General Hospital, since 1938, have had a continuous program of chest examinations of all patients on admission and personnel. Since 1940, the Committee on Tuberculosis of the Minnesota State Medical Association continuously recommended the adoption of these procedures in all hospitals throughout the state, but only Meeker County Memorial Hospital in Litchfield in 1941 and St. Joseph's Hospital in St. Paul in 1950 adopted it. Apparently, the principal reason for delay was because roentgenologists were not convinced of its efficacy and the part they must play in order for the program to succeed.

In 1951, as a member of a committee for hospital admission chest examinations of the Minnesota State Radiological Society, Dr. Ude devoted a great deal of time to preparation of a proposal which was approved by other members of the committee and unanimously adopted by the society. This clarified the subject in the minds of radiologists. After this report, the project, which consisted of examining patients on admission to hospitals and the hospitals' personnel, spread so rapidly that by February 1956, it was being applied to 80 per cent of patient admissions to hospitals in Minnesota.

In June, 1926, Dr. Ude and Miss Valborg Pettersen were married. Their cottage on Big Island in Lake Minnetonka became his hobby. Whenever possible, he spent Sundays and half-days enjoying such chores as chopping down trees and cutting them into firewood. This place was a great source of pleasure and enjoyment to both Dr. and Mrs. Ude for twenty-five years.

They took numerous trips to various parts of the world. They first went abroad by boat to Massina, Sicily, in the spring of 1938. After a cruise on the Mediterranean, they toured Sicily, Italy, Austria,

Czechoslovakia, Hungary, Germany, and northern France in their own automobile. In 1947, they toured Norway and Sweden. The next year they flew to Switzerland where they spent six weeks. In 1949, they flew to Paris, rented an automobile, and spent several weeks seeing France. In 1950, they flew to London, rented a car, and spent six weeks touring England and Scotland and one week in southern Ireland. In 1952, they flew to Spain and spent several weeks there and in Portugal. In 1953, they flew to Copenhagen and in a rented car spent seven weeks touring Denmark, northern Germany, Belgium, and Holland. In 1954, they returned to Scandinavia and toured northern Norway, Sweden, and Finland. The next year they flew to Frankfurt and in a rented car toured southern Germany, but most of their time was spent in Austria, which Dr. Ude especially liked and had hoped to visit again. For a number of years, their winter holidays were spent in the South, one year in Jamaica, one in the Virgin Islands, and the remainder in Florida. Dr. Ude was an avid photographer and had a collection of hundreds of colored slides taken in numerous parts of the world.

On the evening of January 27, 1956, Dr. Ude attended the regular meeting of the Committee on Tuberculosis of the Minnesota State Medical Association. During the evening he expressed great satisfaction in the fact that so much progress was being made with patient admission and personnel examination in so many hospitals. He tarried some time after the meeting adjourned to answer questions about his forthcoming trip. The next morning he and Mrs. Ude left Minneapolis to spend several weeks in Hawaii. The day after his arrival in Honolulu, February 4, symptoms developed which were thought to be caused by an acute infection. He died on February 10.

The announcement of his sudden, untimely death was a severe blow to his many friends and colleagues. Dr. Ude and I had occupied adjacent offices for thirty years. This was a most happy arrangement for prompt and efficient x-ray work for patients. Moreover, he preserved and stored all films of their chests for further comparisons. Through the years he, his associates, and expert technicians gave freely of their time to perform periodic and special x-ray work for all the members of my family and office assistants.

Dr. and Mrs. Ude had no children, but they provided finances for several youngsters to go through the University of Minnesota.

Dr. Ude was loyal to his relatives and friends almost to a fault. His integrity was unquestioned and his generosity and kindness unexcelled.

American College Health Association News . . .

A most successful thirty-fourth annual meeting of the American College Health Association was held in Minneapolis on May 17, 18, and 19. Most of the meetings were in the Hotel Nicollet. On Friday afternoon the association was addressed by Dr. J. A. Myers of the University of Minnesota at the Mayo Memorial Auditorium on the University campus. After the lecture, members were taken on guided tours of the campus and Health Service.

The following persons took office for 1956-57 following the election on Saturday:

President, Paul L. White, M.D., University of Texas; president-elect, Carl Wise, M.D., Columbia University; vice-president, Lewis Barbato, M.D., University of Denver; and secretary-treasurer, Irwin W. Sander, M.D., Wayne University.

Council: Two-year term, (to replace Dr. Barbato) Gayle Pond, R.N., M.A., Western Michigan College of Education; three-year term, (expires 1959) Samuel I. Fuenning, M.D., University of Nebraska, and George Houck, M.D., Stanford University.

President Paul White is already working on committee chairmen for his administration, and announcements will be made of these as soon as possible.

Coffee and refreshment hours were provided on Wednesday afternoon by the host colleges and at varying times during the meetings by the surgical instrument

dealers of Minneapolis, THE JOURNAL-LANCET, and Higham, Neilson, Whitridge and Reid, Inc., of Boston. All of these affairs were much enjoyed.

Plans for next year's meeting in Baltimore are well along under Dr. Paul White and local arrangements chairman, Dr. Frank Smith, Jr., of Johns Hopkins University. Dates are April 25, 26, and 27, 1957.

The Council at its meeting on Friday selected Los Angeles as the site for the 1958 meeting.

Dr. Ruth Boynton and Edward J. Dvorak, of the University of Minnesota, served as the local arrangements committee for the meeting just concluded and deserve a very real vote of thanks by the membership for the splendid program and the efficient way in which it was handled. President Brown made this a part of the official minutes in his closing remarks.

It is suggested that everyone arrange now to attend the thirty-fifth annual meeting in Baltimore. Cross off the dates April 25, 26, and 27 now on your calendar so you can be sure to be there.

* * *

We wish to extend a hearty welcome to the following new member, approved by both the Executive Committee of the association and the membership during the meeting in Minneapolis: The University of Vermont and State Agricultural College, Burlington, Vermont. Representative: Richard W. Amidon, medical director.

The Cornea, by CHARLES I. THOMAS, M.D., 1955. Springfield, Illinois: Charles C Thomas, 1318 pages. \$30.

This volume describes all that is known of the human cornea and many conditions that further investigation will clarify.

In the table of contents, the sub-head title of each paragraph is listed. At the end of each chapter is an extensive and complete bibliography. The book is thoroughly indexed. The illustrations are numerous and clear. Most of them are black and white drawings or photographs. The paper used is glossy and the print large and very readable.

We were quite impressed with chapter 3, "Physiology of the Cornea." Here Dr. Thomas reviews a large volume of material consisting of 23 pages of clear concise information. He states his references carefully. Chapter 4, "Pathologic Physiology of the Cornea," is equally good. Much of this chapter is devoted to wound healing. There are also sections on edema, nutritional differences, vascularization, pannus, and blood staining. Chapter 21, "General Treatment," is good. In addition to the general



medical treatment, the section on iontophoresis is outstanding. The most frequently used medications are given in proper concentration. The chapter ends with a paragraph on experimental studies and clinical results.

Chapters 23 through 32 discuss the history, technic, results, and complications of keratoplasty. The illustrations are beautiful. It seems to us the author has spent a great deal of time on this subject, reviewed it extensively, and carefully selected only that which is known, pertinent, or useful.

This book is very informative and can be recommended to anyone doing work in the field of ophthalmology.

FRANCIS M. WALSH, M.D.
LEON D. HARRIS, M.D.

Modern Diagnosis and Treatment of the Minor Venereal Diseases, by ORLANDO CANIZARES, M.D., 1954. Springfield, Illinois: Charles C Thomas. 131 pages. \$3.75.

This monograph covers in detail the diagnosis and treatment of chancroid, granuloma inguinale, and lymphogranuloma venereum. Under each disease is a table listing the laboratory aids to diagnosis and a table listing the present treatments in the order of their desirability and effectiveness. Differential diagnosis between the three diseases and other diseases with which they may be confused is discussed and the salient points tabulated. The most effective present management is discussed from the point of view of a physician confronted with a patient. The practical aspects of the possible presence of several diseases, including syphilis and gonorrhea, is presented. The material is presented in a form easily available for quick reference. Twenty excellent black and white reproductions of photographs of the various lesions are presented. A bibliography of basic articles and recent publications is included. This excellent monograph is highly recommended.

HUGO E. MILLER, M.D.

Comments concerning this Section, criticisms, or suggestions for papers will be most welcome. Physicians are cordially invited to submit articles pertaining to pain for consideration. All inquiries and manuscripts should be sent to Dr. John S. Lundy, 102 Second Avenue Southwest, Rochester, Minnesota, or to the Editorial Department, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis, Minnesota.

Interscapular Pain

A New Sign in Peptic Ulcer

BERNARD D. JUDOVICH, M.D.,
AND IRWIN J. PINCUS, M.D.

Philadelphia, Pennsylvania

INTERSCAPULAR PAIN is frequently difficult to diagnose and control. This area is often subjected to physical therapy, local anesthesia, nerve blocks, ethyl chloride spray, and other forms of therapy without satisfactory relief. Negative studies and absence of objective findings often pose a problem.

While almost any form of systemic disease and various local conditions may cause interscapular pain, several conditions account for the majority of these cases. These include: (1) herniated cervical disk, (2) cervical rib and scalenus anticus syndrome, (3) intercostal neuralgia, (4) local disease, (5) atypical pain from coronary disease, and (6) visceral referred pain from chest and abdomen. In any of these conditions, pain may be confined to the interscapular region or may radiate laterally or anteriorly.

Herniated cervical disk and other mechanical lesions. The most intense pain may be in the interscapular region with negligible or no pain in the arm. If cervical test-traction provides relief and compression intensifies the pain, these responses are almost pathognomonic of this condition. In addition, tenderness over the lower cervical spinous processes on pressure and percussion and radiating pain to the interscapular region by scalene compression or by rotation and

extension of the cervical spine are further confirmatory signs. Roentgen studies may or may not reveal narrowing of intervertebral spaces at levels which correspond to the clinical findings. Neurologic findings may localize the level of pain. A myelogram may confirm the diagnosis.

Cervical rib and scalenus anticus syndrome. Pressure upon the lower end of the anterior scalene muscle causes intensification of pain not only in cervical rib and anterior scalene syndromes but also in herniated cervical disks and other conditions affecting the nerve roots at these levels. Roentgen studies eliminate or confirm a cervical rib. In a scalene syndrome, diagnostic compression and traction maneuvers of the cervical spine are negative, and the cervical spine moves freely. A diagnostic infiltration of procaine in a primary scalene syndrome relieves pain completely. If a cervical spine or shoulder-girdle lesion causes a reflex scalene contracture, only partial relief is obtained by scalene injection, and the primary cause of the pain must be sought. Most scalene syndromes are secondary. In pain having its origin in the cervical spine region, a clinical clue can be obtained if the interscapular pain can be reproduced or intensified by the various diagnostic maneuvers described.

Intercostal neuralgia. This condition is diagnosed by eliciting segmental tenderness of the painful dermatomes. Tenderness is present from the midspinous line to midline of the chest or abdomen. Paravertebral intercostal nerve block

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serves as a diagnostic as well as a therapeutic procedure. If segmental tenderness is not present, chances of relief with nerve block are remote. Segmental pain and tenderness indicate root irritation, and studies should be directed to areas which could be responsible for the symptoms.

Local disease. In local conditions affecting the interscapular region, tenderness is localized to the painful area only. Radiating pain may be present. Careful search is made for palpable tissue changes, and roentgen studies should include the dorsal spine, scapula, and chest. Visceral referred pain is the condition most apt to be confused with local disease. Anesthesia of a painful area followed by relief of pain may be misleading. Malignancy, not immediately apparent in roentgenograms, may be revealed in serial studies.

Atypical coronary pain. In some instances, pain originating from the heart has its greatest intensity in the interscapular region. Spot tenderness to pressure or pinch may or may not be present. Tenderness is usually absent. All attempts to reproduce the pain by movement of skeletal structures may be negative. A history usually reveals that the pain occurs after exertion. Symptoms can be produced by exercise and relieved by nitroglycerin. Coronary pain may be difficult to diagnose because of completely negative electrocardiographic studies and atypical location of pain. In patients with atypical pain and negative studies, the history may provide the only clue.

Visceral pain. A surprisingly large proportion of patients with interscapular pain proved to have an upper gastrointestinal disturbance, commonly a gastric or duodenal lesion.

Pain in these patients may remain confined to the interscapular region, or it may radiate to the lateral chest wall or abdomen, simulating an intercostal neuralgia. The pain is often extremely severe, either preventing sleep or awakening the patient from sleep. Frequently the pain is in no way associated with visceral disturbances and bears no relationship to food intake. In several patients, the pain was constant and not modified by motion or change of position.

Our first case was that of a patient who was referred for nerve block. The chief complaint was severe, constant, bilateral, radiating pain for seven months. Pain was intense in the interscapular region. Tenderness was absent, nor did signs indicate that the pain was of musculoskeletal origin. Pain was not related to food intake, and

symptoms did not suggest a visceral disturbance. The patient was hospitalized and studied. A deep ulcer of the duodenal cap was found. Pain subsided immediately after ulcer therapy was instituted.

The concept that local pain and reflex radiating pain without pattern tenderness are often indicative of a visceral rather than a musculoskeletal lesion focused our attention upon visceral possibilities at these levels. In a search for pattern tenderness in these cases, tenderness was noted in the midline over D6 and D7 spinous processes. This tenderness is best elicited with a percussion hammer. Percussion should be done above and below these levels, so that the reactions, passing from a nonsensitive area to a sensitive area, can be evaluated. The tenderness over D6 and D7 spinous processes is in the skin. This can be demonstrated by pulling the skin beyond the midline and again percussing the spinous process. Tenderness disappears. If the skin is allowed to return to its position, tenderness is again present on percussion. Anesthetizing the skin with procaine also abolishes the tenderness. The midline tenderness over the sixth and seventh dorsal spinous processes has been present so frequently in upper gastrointestinal lesions that we regard it, in the absence of other symptoms of disease, as a good presumptive sign.

As we saw these cases, we became increasingly aware that absence of gastrointestinal symptoms and negative roentgen studies did not eliminate a lesion. This should have been evident because of the asymptomatic patients who suffer gastrointestinal hemorrhages and exhibit no objective findings after thorough investigation. On the other hand, a lesion is impossible to diagnose prior to onset of hemorrhage or perforation unless a clue of some kind is present to create suspicion of a lesion.

In one of our early cases, when we were aware of the possible upper gastrointestinal lesions but were not yet acquainted with the tenderness at D6 and D7 levels, a student came in with severe interscapular pain. He was referred as a case of intercostal neuralgia. We did a nerve block without relief and suggested an upper gastrointestinal study. The patient was due back, but did not return because of hemorrhage from a duodenal ulcer several days later.

In a patient referred for nerve block, D6 and D7 spinous processes were tender to pressure and percussion. There was no evidence of pattern tenderness in the periphery. We advised

an upper gastrointestinal study, suggesting the possibility of an ulcer. This patient was studied, but no abnormalities were found. He collapsed from hemorrhage three months later and was told he had an occult ulcer.

One patient returned to the office with severe interscapular pain two weeks after laminectomy for a cervical disk. Ordinarily this condition would have been attributed to postoperative pain, but examination revealed tenderness of D6 and D7 spinous processes. X-ray films revealed a small duodenal ulcer. Immediate relief was obtained by means of diet and medication.

Another patient suffered for four months with extremely severe *constant* pain which radiated from the interscapular region to the right chest. Various forms of therapy gave no relief. Because of local pain and tenderness, a portion of rib had been resected on the right side without relief. Little sleep was obtained during this period and the patient lost 25 lb. Symptoms did not suggest a visceral disturbance. Examination revealed tenderness over D6 and D7 spinous processes and a small area of spot tenderness in the right lateral chest wall. Roentgenograms revealed a moderate sized gastric ulcer crater. Relief of pain was immediate with ulcer therapy. *Tenderness of D6 and D7 spinous processes persisted until serial studies showed complete healing, at which time the tenderness disappeared.*

Another patient complained of severe constant interscapular pain for two years and had been taking physical therapy and bending exercises. Acute sensitivity to percussion over D6 and D7 spinous processes was the only surface manifestation. This patient proved to have a walled-off, perforated gastric ulcer.

In a number of patients who came to us with complaints other than interscapular pain, gastric or duodenal pathology was uncovered merely by discovering the tenderness of the middorsal spine in a routine examination.

For example, two patients complained of severe headache. In one patient, temporal arteritis caused the pain. In the other, no cause for the headache could be found.

In both, however, during the routine examination, pronounced tenderness over D6 and D7 spinous processes was noted. In both cases, an ulcer crater was demonstrable by roentgen studies. One patient was placed upon medical therapy; the other had a resection for a prepyloric ulcer. Ten days after surgery, the tenderness over the sixth and seventh dorsal spine had disappeared.

One patient complained of severe constant interscapular pain radiating to the left chest wall. History revealed that a left-sided lobectomy for malignancy had been performed three years before. The pain was constant and so severe that narcotics were used over this period. He was studied repeatedly for evidence of malignancy. Examination revealed tenderness over D6 and D7 spinous processes. No tenderness was present elsewhere. This patient was one of six in our series who obtained relief a few minutes after the administration of an acid adsorbent. He recalled afterward that he had been treated for an ulcer twenty-five years before. Diet and medication succeeded in eliminating the pain completely.

Another patient was admitted to the hospital complaining of sudden weakness and tarry stools. Pronounced tenderness was present over D6 and D7 spinous processes. No gastrointestinal symptoms nor pain had been experienced. Initial roentgen studies revealed no abnormal findings. Subsequent studies revealed an inconstant fleck, which suggested an ulcer crater.

These are but a few of the patients we have observed with gastrointestinal lesions as the cause of severe interscapular pain. Most of these cases were confirmed by roentgen studies.

DISCUSSION

What then should make us suspicious of visceral pain in this area? First, an examination and study to rule out pain possibly referred from the cervical spine, such as a disk or other cervical spine lesion, osteoarthritis, cervical rib, or scalene syndrome. Intercostal neuralgia, local lesions, atypical heart pain, or a chest lesion should be excluded.

The most constant sign we have observed has been tenderness to pressure and percussion over D6 and D7 spinous processes. This may be associated with areas of spot tenderness in the periphery of these levels. Most often it is not. We cannot depend upon the fact that no gastrointestinal symptoms are present nor that pain is not related to food intake. Pain may be constant and may become severe during the night. Roentgenograms do not always reveal the presence of a lesion. In some patients who presented the above signs, and whose studies were negative, diet and medication caused cessation of symptoms.

In our series, the incidence of tenderness may be misleading, because only those with tenderness elicited at D6 and D7 levels were studied.

The true incidence of this test can be determined only by examining a large series of patients with known pathology.

Many investigators have mentioned various painful and tender zones which accompany peptic ulcer. The segmental zones of tenderness described by Head and others appear to be not only clinically unreliable but nonexistent as a dermatome pattern. Tender dermatomes, in our experience, indicate root irritation rather than referred visceral pain. Although no dermatome tenderness develops with visceral referred pain, small localized areas of pain and skin tenderness may develop in the periphery. These, like the tenderness at D6 and D7 midline, appear to be sympathetic in origin, possibly caused by impulses from the painful lesion to the sympathetics. These areas of pain are not, however, associated with any recognizable pattern of tenderness.

Boas has mentioned back pain at D10, D11, and D12 levels either to the left or right of the midspinous line. In our experience, paravertebral tenderness is unusual, and midline tenderness is most frequent but at higher levels, usually at D6 and D7. Bockus has also mentioned that he has found tenderness at higher levels than those described by Boas. He mentions D7 to D10 as the levels involved and minimizes the importance of Head's zones.

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SUMMARY

In all, we had 68 patients in our series. Most of these patients were referred for some form of musculoskeletal pain. Some had already been given nerve blocks or other forms of local therapy. Some abnormal change was noted in the gastrointestinal studies of two-thirds of the patients.

23 patients had demonstrable ulcers.

15 cases of scarring and distortion from previous ulceration were reported.

6 cases of duodenitis were reported.

22 patients had negative reports.

2 patients had no roentgenograms, but pain cleared up promptly on ulcer therapy.

3 patients whose original reports were negative had hemorrhages.

1 patient had a hemorrhage before roentgenograms could be taken.

The percussion test has its greatest value as a diagnostic sign in those patients who do not present typical ulcer symptoms. It has enabled us to diagnose cases not only with interscapular pain but also several cases of silent ulcer, that is, patients without gastrointestinal complaints and without pain.

It takes but a few moments to percuss the middorsal spine, and we feel that the routine use of this test is of diagnostic value in uncovering some of our obscure cases.

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Current Literature on Pain

THE MANAGEMENT OF PATIENTS WITH ACUTE BARBITURATE POISONING, by J. B. DILLON. *Anesth. & Analg.* 33:381-385, 1954.

"In the year 1952-1953 there were 398 patients with barbiturate poisoning admitted to the Los Angeles County Hospital with 17 deaths or a mortality rate of 4 per cent . . . The symptoms and signs of barbiturate poisoning may vary widely . . . The most difficult patient is the one who is brought into the emergency room in a deep coma of unknown duration, and who has ingested or is suspected of having ingested an unknown quantity of some barbiturate. Occasionally the problem of differential diagnosis presents itself as to the cause of this coma . . . If a conscious patient with a history of having ingested a quantity of barbiturate is brought into a doctor's office, such a patient should immediately be given a gastric lavage . . . In the more common cases

in which patients are brought into the hospital as an emergency, in a greater or lesser state of coma and collapse, the first problem of treatment and management is in the assurance of oxygenation and ventilation . . . Oxygen therapy is indicated in all cases of acute barbiturate intoxication . . . One serious problem associated with respiratory depression in these cases is the presence of pulmonary edema to a greater or lesser degree . . . If any evidence of either pulmonary edema or congestion is present, then the patient should receive some form of supplementary ventilatory assistance, particularly the utilization of intermittent positive pressure breathing. Facilities for pharyngeal and tracheal suction should be available. Tracheobronchial toilet should be performed as needed . . .

"In general, the use of potent respiratory stimulants is

(Continued on page 209)

Editorial

NEW ENEMIES OF PAIN

ANYONE who administers pain-relieving drugs inevitably encounters the very serious problem of overdose. Overdosage may come about by design or it may be an accident. Whatever the cause, when this does happen, a critical situation must be mastered with alacrity. In times past, when the drug in question was morphine, very little could be done for the patient, except to offer supportive therapy. In that hapless era, physiologic detoxication had to depend on the resources of the patient.

Fortunately, that desperate situation appears to have departed. For some time a new agent, Nalline Hydrochloride (N-allylnormorphine hydrochloride), has been available to physicians. This drug, administered to a patient affected by an overdose of morphine, neutralizes the effect of that powerful narcotic in less than a minute. Yet the prime element of caution is needed here, as elsewhere in anesthesiology, for Nalline Hydrochloride by itself produces a morphine-like effect. Hence, if this new agent chanced to be given to a patient to relieve poisoning with a barbiturate, it would only add to the depression. A tincture of utility appears in the fact that, when the circumstances of the poisoning are not known, the increase in depression might disclose that the narcotic taken was not morphine, but,

even so, such a demonstration would jeopardize the patient.

On the other hand, still another new agent has been made available which will neutralize the effects of many depressant drugs. This is Lorfan tartrate. It can be used to advantage either when an overdose has been given or when a patient is highly sensitive to a narcotic drug.

A good example of the usefulness of Lorfan tartrate is seen in a recent incident. A woman of 100 lb. and in the sixth decade but appearing older, was given 1/100 gr. of scopolamine and 1/6 gr. of morphine by hypodermic injection. Additional morphine was administered a little later. When the woman reached the operation room, she was in a stupor, breathing only 9 times a minute, and she was slightly dusky. This state increased during a short operation on the eye. When the drapes were removed, the patient appeared to be in a precarious condition. What was to be done? Summary action was imperative. An intravenous injection of 1 cc. of Lorfan tartrate was administered. In less than a minute the patient was breathing 20 times a minute, her color was good, and she began to regain consciousness.

Observations made thus far seem to indicate that a drug such as Lorfan tartrate should be readily available at all times, so that in the incessant drive against pain the means of making hazardous conditions amenable to treatment may be enhanced.

JOHN S. LUNDY, M.D.

Book Reviews on Pain

JOINT LIGAMENT RELAXATION TREATED BY FIBRO-OSSEOUS PROLIFERATION, by G. S. HACKETT, M.D., consulting surgeon, Mercy Hospital, Canton, Ohio, 1956. Springfield, Illinois: Charles C Thomas, 97 pages. Price \$4.75.

The author, in explaining his purpose in writing this book, states, "This presentation has the objective of assembling for the first time the fragments of knowledge that have previously been recorded concerning the disability of articular ligaments and correlating (*sic*) that knowledge with the accomplishments which I have been able to make in the past sixteen years while investigating ligament disability from the standpoint of embryology, anatomy, pathology, etiology, symptoms, diagnosis, confirmation of diagnosis, trigger points of pain, referred pain areas, and treatment by a method of strengthening weakened ligaments to re-establish joint stabilization and permanently eliminate pain and joint disability."

The author has had considerable opportunity to gain experience in this field, since for twenty years he has

carried on a large practice in traumatic surgery and also has been consultant to approximately 70 accident-insurance companies in the reporting of accurate diagnoses and prognoses. He declares that ligament relaxation is the only condition (disability or disease) in which diagnosis can be confirmed both before treatment and at each treatment. He repeats what no one will deny: that ligaments supporting the skeletal articulations have been developed over millions of years for the purpose of stabilizing joints at all positions and limiting the extent of motion in all directions. He then remarks that the early anatomists dissected the ligaments and named them, after which nothing much was done about them. The function of the ligaments, he says, was taken for granted. They were regarded as inaccessible for true determination of continued disability because they cannot be observed or palpated and are not revealed in roentgenograms.

Yet, according to the author, ligaments are intimately concerned in different kinds of injuries. He goes into the background of different races of people, the type of

work they have done, and why they did or did not develop the stretching of ligaments. The chief symptom of ligament relaxation is pain, he says, and pain which accompanies ligament relaxation is aggravated by activities when tension is exerted on the ligament in question. The pain usually subsides when the ligament is relaxed in inactivity. Residual pain may be caused by muscle spasm.

The author discusses establishment of the diagnosis, how to conduct a physical examination toward the objectives to which he is devoted, and how to confirm the diagnosis. He considers the trigger points of referred pain. When he writes about the cervical ligaments, his convictions appear to be somewhat less than positive. He presents the history of sclerosing and the agents that produce proliferation of ligaments. The proliferant he uses is called sylnasol, which is a solution of the sodium salt of the fatty acids of psyllium seed oil. The local anesthetic agent he uses is an 0.15 per cent solution of tetracaine hydrochloride (Pontocaine hydrochloride).

The author commits the imprudence of making one statement which ought never to have been made: he recommends meperidine hydrochloride (Demerol hydrochloride) for relief of chronic pain. This is a piece of fallacious beneficence, for the truth is that probably no more unfortunate counsel could be given to a patient in pain than the prescription of this agent. Actually, the rapidity with which addiction to Demerol hydrochloride develops is frightening, and use of the compound for the alleviation of chronic pain is more than deplorable.

Certain illustrations which depict the essential points of treatment are included. The book is printed on good paper. A bibliography is included, but unfortunately there is no index. A degree of diligence in orthographic matters would have been uncommonly rewarding to this text; the repeated use of such a nonexistent word as "hernea," and such departures from custom as "saluatory effect," "rabbits tendons," and "correllating" do not enhance the credibility of that which the author has to say. Certain reports of cases are presented, and altogether the book is very worth while for those who care for patients suffering from relaxation of joint ligaments.

JOHN S. LUNDY, M.D.

NORADRENALINE, by U. S. VON EULER, M.D., professor of physiology, Faculty of Medicine, Karolinska Institutet, Stockholm, Sweden, 1956. Springfield, Illinois: Charles C Thomas, 382 pages. Price \$11.50.

The publisher says of this book that "An attempt is made to give a fairly *comprehensive series* of data concerning noradrenaline in its functions as the SYMPATHETIC NEUROHORMONE and as a SUPRARENAL MEDULLARY HORMONE, together with some implications as to *its use as a therapeutic agent*."

"The OCCURRENCE, PROPERTIES, and ACTIONS of noradrenaline have been treated in a series of chapters, including a *brief historical review*. In general, the chemistry, physiology, pharmacology, and clinical applications have been subject of treatment. *Methods for its estimation* are presented in detail."

This important substance, noradrenaline, is dealt with at great length and in great detail—chemically, pharmacologically, physiologically, and clinically. An extensive bibliography makes the book extremely valuable. It is well indexed and should be a fine reference for all who are concerned with this important substance.

JOHN S. LUNDY, M.D.

THE PSYCHOSOMATIC GENESIS OF CORONARY ARTERY DISEASE, by DON CARLOS PEETE, M.D., associate clinical professor of medicine and lecturer in the history of medicine, University of Kansas School of Medicine, 1955. Springfield, Illinois: Charles C Thomas, 220 pages. Price \$7.75.

This book is the result of a search for a better method of imparting an understanding of psychosomatic disease. Much historic material is cited to show that there is an extensive interlocking of factors in coronary arterial disease. After explanations and illustrations which make clear the author's objectives, there is a chapter on treatment which includes the important measures of nursing therapy, diet therapy, drug therapy, and psychotherapy. The approach to this problem is unique and will be of interest to a great many persons.

JOHN S. LUNDY, M.D.

CURRENT LITERATURE ON PAIN

(Continued from page 207)

contraindicated . . . Once steps have been taken to relieve hypoxia, the associated vascular problem should be approached and an intravenous solution of 5 per cent dextrose and saline should be started. After several hundred cc. have been administered and respiration is adequate, if the blood pressure does not respond with an associated slowing of the pulse, a vasopressor may be employed . . . If hypothermia exists, the patient should be warmed only sufficiently to prevent further heat loss . . . There should be no attempt to produce a hyperthermia . . . If coma persists for more than 24 hours, nutrition should be started parenterally with blood chemistry control . . . It is mandatory that an indwelling catheter be inserted in all comatose patients . . . The patient in coma should be turned and the extremities

should be given passive exercise in order to prevent stasis and circulatory congestion. Such changes in position and exercise should be given on a half-hour basis, or more often. It is possible that cerebral edema may play a significant role in delayed awakening from barbiturate poisoning. If such a situation is suspected, it should be treated with the administration of 25 per cent human albumen."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1955, Vol. 41. Copyright by J. S. LUNDY.

STRESS, by E. E. BEARD. *Am. A. Nurse Anesthetists* 23:45-49, 1955.

"By the word 'stress' the physicist means the interaction between a force applied to an inanimate object and the resistance to that force offered by the object. The force

tends to deform the object and the object resists being deformed. The word 'stress' was introduced into medicine to indicate a biologic counterpart of this physical concept. A state of biologic stress occurs in a living body whenever it is affected by an agent capable of doing damage. This effort of the organism to maintain the status quo and the mechanisms utilized by it in so doing have been of high interest to a number of able investigators for many years. . . . In 1936 Selye first published his observation that the systemic reaction of the body was much the same, regardless of the nature of the damage inflicted. He saw that various stress-producing agents (trauma, toxins, asphyxia, infections, and even nervous strain) produce a syndrome of reaction which consists basically of atrophy of the thymus and lymphoid tissue, gastro-intestinal ulceration and enlargement of the adrenal cortex. Following the clue of the enlarged adrenal cortex he found that there is, indeed, an increase in the amount the adrenal cortical hormones produced in the state of stress, and that some of the effects of this increased hormone production are of benefit in helping the body adjust to and resist damage. He showed that adrenalectomized animals are very inefficient in adapting themselves unless they are given corticoid hormones. This fits perfectly with what had been known for some time about people suffering from Addison's disease. . . .

"The nature of the adrenal cortical hormones were made clear when pure preparations of them became available, and it was possible to examine their separate functions. Bit by bit it was established that the adrenal cortex is a very important organ in maintaining the balance of the body in regard to sodium, potassium, water and glucose; that it contributes greatly to the proper functioning of the cardio-vascular, the gastro-intestinal, the urinary, and the nervous and the hematopoietic systems. Most recently it has been discovered that it is the organ which, in large part, directs tissue response locally to injury; that is, regulates the amount of inflammatory reactions and connective tissue formation at the site of attack. Probably by way of this tissue control (quite possibly also by means of some other effect) it in some degree determines the resistance of the body to infection. The hormone which controls sodium, potassium, and water balance is referred to as the 'electrolyte-balance' hormone, or the 'mineralocorticoid.' The name 'electrocortin' has recently been suggested for it. It also acts to stimulate the inflammatory and connective tissue response to injury, and in this role it has been referred to as the 'prophlogistic' hormone. The growth hormone of the pituitary (STH) affects tissue in the same way, and so cooperates with the prophlogistic hormone of the adrenal. The hormone which has to do with the regulation of the blood sugar, and which, among other things, affects the nervous system and the composition of the blood, is called the 'glucocorticoid' or 'glucose metabolism' hormone. We believe that hydrocortisone, very similar in its effect to cortisone, is the glucocorticoid produced by the adrenal cortex. This same hormone operates to resist the inflammatory and connective tissue response, and so has been called also the 'antiphlogistic' hormone. As a reaction to injury of whatever nature, it has been fairly well established that the pituitary is stimulated so that it puts out more of the growth

hormone (STH), and ACTH. The former acts, in conjunction with the prophlogistic hormone electrocortin, to promote tissue reaction to the damaging agent. This helps in repair and probably also in resistance to infection. The latter, ACTH, stimulates the adrenal to increase its output of hydrocortisone (glucocorticoid and antiphlogistic) which, in turn, acts to increase blood sugar, elevate the white blood cell count, keep fever down, and to resist tissue reaction. All these effects must be in proper balance in order to serve the best interests of the body, and dire results might follow if one should dominate all others. Certainly it has been learned from animal experiment and from observations in humans that with the mineralocorticoid one can produce edema and hypertension, and that with the glucocorticoid one can produce interference with wound healing, diabetes, psychosis, etc. Some recent work suggests that the pathogenesis of some types of leukemia may involve imbalance of the adrenal hormones. In the field of reaction to infection there is much evidence to support this theory. The rat normally is highly resistant to infection with tubercle bacillus; with cortisone or ACTH it may be made quite susceptible. . . .

"The whole effort of the anesthetist is to shield the patient from stressors such as pain, nervous, shock, anoxia, fatigue, chilling, blood loss, dehydration, and chemical imbalance. It must be remembered that the anesthetist is, in itself, a stressor of the first magnitude."

From LUNDY, J. S., and MCQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Co., 1955, Vol. 41. Copyright by J. S. LUNDY.

THE USE OF NOREPINEPHRINE IN VARIOUS STATES OF SHOCK, by J. E. ECKENHOFF and R. D. DRIPPS. *Anesthesiology* 15:681-688, 1954.

"Despite certain theoretical objections to the use of vasoconstrictor drugs in the management of shock, any possible improvement in the therapy of this condition deserves careful study. In this article, we plan to present our observations on the use of norepinephrine in shock as seen recently in military and civilian practice. . . . When norepinephrine contributes to the resuscitation of an individual in shock, it probably does so by mobilizing stagnant blood, preventing pooling of blood in dilated vessels, increasing peripheral resistance, increasing venous return to the heart, and improving blood flow through vital tissues as a result of raised arterial blood pressure. . . . These vascular actions are not always possible. Under such circumstances norepinephrine may not be useful. It seems probable on the basis of our data and those of other investigators that norepinephrine is most helpful in hemorrhagic and wound shock, and in those hypotensive states directly related to peripheral vasodilation. Obviously, it is difficult to obtain control data under the conditions in which norepinephrine is indicated. The remarks contained herein are our clinical observations. It is possible that observations made with the use of Neosynephrine or other pressor drugs may parallel those we have reported. It is our distinct clinical impression, however, that norepinephrine benefited these patients more than other pressor drugs which are now available."

From LUNDY, J. S., and MCQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1955, Vol. 41. Copyright by J. S. LUNDY.



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REFERENCES:

1. J.A.M.A. 159:645 (Oct. 15) 1955.
2. J.A.M.A. 158:386 (June 4) 1955.



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News Briefs . . .

North Dakota

DR. K. P. MALVEY, of Bottineau, has been elected a member of the newly formed Advisory Board for the Florence Crittenton Home at Fargo. The purpose of the Advisory Board, which is made up of 28 representative citizens from all parts of North Dakota, is to acquaint local communities with the services offered by the home to unmarried mothers.

DR. D. ROBERT McBANE, who recently completed his internship at Winnipeg General Hospital in Manitoba, plans to open an office in Towner early in July.

Minnesota

THE MENTAL HYGIENE CLINIC at Duluth has moved to new and larger quarters. With more space available, work in group therapy is now possible. Plans call for an expansion in work with children in particular.

DEDICATION of the \$750,000 addition to Itasca Memorial Hospital at Grand Rapids took place recently. Visitors were taken on conducted tours of the building, which represents an expenditure of more than a million dollars. Dr. M. J. Schirber heads the medical staff of 21 doctors.

THE FIRST GENERAL MEETING of the Lay Society of the Twin Cities Diabetes Association was held in Mayo Memorial Auditorium on May 23. Purposes of the new organization are to further the understanding of the problems of diabetes, promote education for a better knowledge of diabetes, and foster more research into the cause of the disease and its ultimate control. The society is conducting a membership drive among the estimated

15,000 to 20,000 diabetics in the twin city area. Anyone interested in joining the group is asked to call the temporary secretary, Mrs. Mannie Guggenheim, 5225 Minnetonka Boulevard, Minneapolis.

DR. HOMER BASINGER and DR. HAROLD BASINGER, a father and son team, are responsible for the erection of a physicians and surgeons building in Windom. The one-story structure will include private offices, examination rooms, laboratory, waiting room, x-ray room, and a minor surgery room. Construction began in June and is expected to be completed in the fall.

DR. MAURICE VISSCHER, professor and head of the department of physiology at the University of Minnesota, was recently elected to membership in the National Academy of Sciences in recognition of his many outstanding, scholarly contributions to research in physiology and allied medical sciences.

DR. NELLIE BARNES, of St. Paul, was named Minnesota's woman doctor of the year at the annual meeting of the Minnesota Medical Association. Dr. Barnes has practiced more than fifty years.

DR. J. ARNOLD BARGEN has been named 1957 president of the Minnesota State Medical Association. A physician at the Mayo Clinic since 1923, Dr. Borgen is its 1956 staff president. Dr. Raymond L. Page, St. Charles, was named first vice president; Dr. W. E. Wellman, Rochester, second vice president; Dr. Donald McCarthy, Minneapolis, treasurer; and Dr. B. B. Souster, St. Paul, was re-elected secretary.

DR. HAROLD E. MILLER has been elected president of the staff of Northwestern Hospital, Minneapolis, succeeding Dr. A. A. Zierold. Dr. Richard E. Reiley was elected vice president and Dr. Albert J. Schroeder, secretary-

(Continued on page 26A)

APPROXIMATE COMPARATIVE ANTITUSSIVE AND ANALGESIC DOSES OF OPIATES

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NEWS BRIEFS

(Continued from page 24A)

treasurer. Chiefs of services are: Dr. Albert J. Hays, surgery; Dr. Mark C. L. Hanson, internal medicine; Dr. Edgar Ingalls, obstetrics and gynecology; Dr. Richard Tudor, pediatrics; and Dr. L. L. Kallestad, general practice. The new officers will be installed September 1.

DR. HENRY B. BLUMBERG has established practice in St. Paul. A graduate of Northwestern University Medical School, Dr. Blumberg attended the University of Minnesota for eighteen months of postgraduate training, followed by a year of training in Boston and a year at San Joaquin General Hospital, French Camp, California.

DR. LESTER L. BISSINGER, surgeon, has become associated with Drs. G. I. Badeaux and Maurice Meller of the Brainerd Clinic. Formerly Dr. Bissinger was an assistant director of the Cancer Detection Center at the University of Minnesota.

DR. LAURI E. KOSKALA, former Deer River physician and surgeon, recently opened an office in Carlton.

DR. T. A. CLIFTON, who has practiced in Chatfield for the past thirty-four years, is retiring from practice. Dr. Clifton has been a physician for forty-six years. He and his wife plan to make their home in Hollywood, Florida.

Deaths . . .

DR. EVERETT C. HARTLEY, 65, St. Paul obstetrician and gynecologist, died May 1. Dr. Hartley was an associate professor at the University of Minnesota Medical School.

DR. ROBERT R. TRACHT, 56, St. Paul ophthalmologist, died of a heart attack May 25. Dr. Tracht was an associate professor of ophthalmology at the University of Minnesota.

DR. JOHN P. WILKINS, 81, a physician in Mound, Minnesota for fifty-five years, died May 31. Dr. Wilkins was the only "family physician" in the community for many years.

DR. FLOYD D. GILLIS, 68, prominent physician in Mitchell, South Dakota, died of a heart attack May 30. At the time of his death, Dr. Gillis was president of the State Board of Physicians.

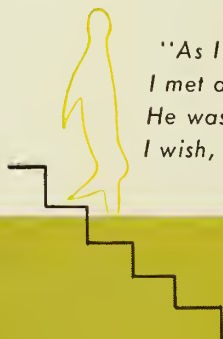
DR. W. A. GEORGE, 82, of Selby, South Dakota, died May 22. Dr. George had practiced medicine in South Dakota since 1908.

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I wish, I wish he'd stay away,"
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LABORATORIES

COMING in *September* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- This year the Transactions of the North Dakota State Medical Association will appear in two issues, September and October. The first part will include the list of officers and the presidential address delivered at the annual meeting of the association, which was held this year in conjunction with the South Dakota State Medical Association in Aberdeen, South Dakota. Also appearing in this issue will be reports of the secretary, executive secretary, treasurer, councillors, and the various committee reports.

- If colic, vomiting, diarrhea, nasal stuffiness, cough, and wheezing occur in infants during the neonatal period, milk allergy is apt to be the cause. Several such cases are reported in "Gastrointestinal Allergy to Cow's Milk in the Neonatal Period" by Robert B. Tudor, M.D., of the Quain and Ramstad Clinic, Bismarck, North Dakota. In each instance, symptoms cleared when milk was removed from the diet.

- The advantages and disadvantages of several surgical procedures for the correction of mandibular protrusion are discussed in "Treatment of Prognathism of the Mandible" by John B. Erich, M.D., of the section of plastic surgery and laryngology at the Mayo Clinic. Bilateral ostectomy, performed in three stages, is described in detail and is believed by the author to produce more satisfactory results in these cases of mandibular protrusion than any other operation. This procedure seems rather simple when compared to some of the more formidable operations which have been devised for this deformity.

- Treatment of complications which develop in the patient with multiple sclerosis, such as decubitus ulcers, urinary disorders, severe spasticity, and muscle weakness are discussed in "Rehabilitation of the Multiple Sclerosis Patient" by Harold A. Ladwig, assistant professor of neurology and psychiatry at Creighton University School of Medicine, Omaha, Nebraska. Occupational therapy and vocational guidance should be included in all rehabilitation programs. Whereas the aim of such a program is to teach the patient to live with his disabilities and use his residual capacities to the utmost, this objective will not be reached unless the emotional problems of the patient are recognized.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA MEDICAL CONTINUATION COURSES

September 25-27—Pediatrics for Pediatricians.

October 18-20—Technics in General Practice.

October 22-24—Gynecology for General Physicians.

November 5-9—Radiation Therapy for Radiologists.

November 19-21—Fractures for General Physicians.

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

COURSES IN DISEASES OF THE CHEST

Postgraduate courses in Diseases of the Chest, sponsored by the Council on Postgraduate Medical Education of the American College of Chest Physicians, will be held October 15-19 at Hotel Knickerbocker, Chicago, and November 12-16 at the Park Sheraton Hotel, New York City. For further information, write the Executive Director, American College of Chest Physicians, 112 E. Chestnut St., Chicago 11.

COURSE IN GASTROENTEROLOGY

The annual postgraduate course in Gastroenterology will be held at the Roosevelt Hotel, New York City, October 18 through 20. Dr. Owen H. Wangenstein of the University of Minnesota, director of the course, will serve as surgical coordinator; Dr. I. Snapper of Beth-El Hospital, Brooklyn, will serve as medical coordinator. For further information, write the American College of Gastroenterology, Department P.G., 33 W. 60th St., New York City 23.

INTERNATIONAL COLLEGE OF SURGEONS TO HOLD CONGRESS

United States and Canadian Sections of the International College of Surgeons will hold their annual congress at the Palmer House, Chicago, September 9 through 13. In addition to assemblies and section meetings, all-day scientific film programs will be given, and a film forum will be presented Monday evening. For further information, write the Secretariat, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10.



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Nonspecific Diarrheas

JAMES MYHRE, M.D.

Minneapolis, Minnesota

THE SYMPTOMS of nonspecific, common, brief-duration type of gastroenteritis are familiar to the physician professionally and all too frequently personally. The symptoms of this "something going around" are the familiar nausea, vomiting, diarrhea, chilliness, achiness, weakness, and frequently fever. This omnipresent scourge is found in all gradations of severity. It can be explosive from both exits of the gastrointestinal tract or simply nausea with cramps and diarrhea. The signs and laboratory data are generally not assessed, but often leukocytosis with neutrophilia is present, and usually the watery stools do not contain blood. The condition is generally diagnosed over the telephone and well treated the same way. Patients should be off their feet if symptoms are severe. They soon learn that they are comfortable lying down but, in an upright position, an immediate urge to evacuate occurs. These patients should rest or be very quiet as long as a fever persists. Much comfort can be derived from the warmth and pressure of a hot water bottle or a heating pad applied to the abdomen. Neither food nor liquid should be forced.

The earliest tolerated liquids are 7 Up, gingerale, and tea. Later, when hunger is added to the thirst, the patient can usually tolerate toast, jello without fruit, soft boiled or poached eggs, cooked cereal, and plain custard. Still later, cooked low residue vegetables and ground or lean meat and mashed potatoes, with little sea-

soning, should be considered. People with a sensitive gastrointestinal tract or an irritable bowel would be wise to avoid highly-seasoned, greasy, fried, or rich foods or banquet quantities of foods for three or four days after they completely recover. Careful hand hygiene is important after every bowel movement, and if the illness appears to be strictly a family epidemic, then old or suspicious food should be discarded as the possible origin of the inciting agent. Medicinal treatment is withheld by some physicians until twenty-four hours have elapsed on assumption that the diarrhea may evacuate the inciting agent. The British frequently urge a purge with castor oil, but this seems rather drastic. The gastrointestinal tract is, of course, irritated by the inciting agent, and castor oil would further insult an already badly inflamed system.

Paregoric is a good agent for control of diarrhea and relief from cramps. A dose of 1 tsp. four times a day or 1 tsp. after each bowel movement is most effective. If bismuth preparations are used, bismuth subcarbonate and not bismuth subnitrate should be prescribed, inasmuch as the *Escherichia coli* of the gastrointestinal tract convert the nitrate into nitrite and, particularly in children or after long-term usage, could lead to methemoglobinemia. Kaopectate, 2 to 4 tbsp. four times a day, is very helpful. Multiple preparations on the market combine common antidiarrheal agents with antibiotics, such as neomycin or sulfa preparations. These antibiotics are men-

JAMES MYHRE is clinical assistant professor of medicine at the University of Minnesota Medical School.

Delivered for a Course in Gastroenterology, December 3 to 5, 1955, at the Center for Continuation Study, University of Minnesota.

tioned only to be condemned, for they should be saved for those instances in which a specific diarrhea is diagnosed by bacteriologic studies or at least until the diarrhea has become more or less chronic or intractable. The antibiotics more than double the price of the common antidiarrheal agents and, in addition to containing insufficient antibiotic to treat the diarrhea, if it should be a specific type, these agents lead to the ever-lurking threat of a postoral-antibiotic diarrhea. We frequently see patients with acute diarrheas of brief duration who have taken potent oral antibiotics containing none of the antidiarrheal agents who, as a result, are suffering from a postoral-antibiotic diarrhea with the distressing perianal irritation.

If the diarrhea persists more than three or four days with the conservative program mentioned previously or especially if the patient has shivering chills, a high persistent fever, or if blood appears in the stools, then the illness must be honored by more serious consideration including a careful history and examination. Inquiry should be made about travel in foreign countries and the use of oral antibiotics. Stool cultures should be taken. Hospital facilities are perhaps the best for this procedure, but an extremely useful expedient is provided by the Minnesota State Board of Health. It furnishes a stool culture kit for home use. After depositing a sample, the kit is mailed for culture for pathogenic bacteria or parasites to the State Board of Health. I have received positive reports on *Salmonella* or paratyphoid organisms, *Shigella* organisms, and *Endamoeba histolytica*. Though these cultures have been mailed in the winter, in addition to these pathogens, I have received reports on *Endolimax nana*, *E. coli*, *Trichuris trichiuria* (whipworm), and *Enterobius vermicularis* (pinworm). The original leukocytosis or neutrophilia and perhaps the initially elevated hemoglobin caused by dehydration generally disappear after the acute stage, and these blood studies are normal. The sedimentation rate is frequently elevated and may or may not indicate metastatic abscesses which occur from the *Salmonella* bacteremia as opposed to a thyroid bacteremia. The blood cultures are generally positive in the first week in typhoid and *Salmonella* infections, and thereafter the urine and stool cultures are more apt to yield the organism. If the patient has not been in military service nor received inoculations because of foreign travel, the agglutinations for typhoid and paratyphoid fever are, of course, available through the State Board of Health and are helpful, but agglutinations for bacillary dysentery are generally of no help.

Proctoscopic and digital examinations are necessary in any chronic diarrhea, for this is the time that the ever-lurking carcinoma of the rectum is discovered, as well as chronic ulcerative colitis. The great bulk of lesions of ulcerative colitis are found in the rectum. The small ulcer with normal intervening mucosa of the amebic dysentery is also seen and contrasted to the large, ragged ulcer with abnormal surrounding mucosa as seen in chronic ulcerative colitis. A colon roentgenogram, of course, is helpful for chronic ulcerative colitis, malignancy of the colon, and regional ileitis. In instances of a negative colon roentgenogram, particularly if the terminal ileum is not visualized, a small bowel roentgenogram is essential. A gastric analysis should be performed no matter how unscientific this procedure may seem to those who scoff at giving 15 drops of U.S.P. dilute hydrochloric acid three or four times a day. They justifiably think that the large volume of acid secreted by the normal stomach is an ocean compared to the comparably less than homeopathic 15 drops, but administration of just that small dosage does help some people who have diarrhea and achlorhydria. This dosage also sometimes aids chronic gastric distress.

A chest roentgenogram is essential for almost every sick person. Of course, if the film is normal, tuberculous enteritis would practically be eliminated, for, in the vast majority of cases, tuberculous enteritis and diarrhea occur in people with far-advanced pulmonary tuberculosis. Conditions that should be considered include intestinal obstruction; deceptive fecal impaction in hospitalized and not only in aged or bedridden patients; hyperthyroidism with perhaps diarrhea as the only presenting complaint; burns or peritonitis; sprue; chronic pancreatitis causing a pancreatogenic steatorrhea; the unexplained nocturnal diarrhea of diabetes, mercury, arsenic, and alcohol. Some people have slight chronic diarrhea resulting from residence in a new locality and the new type of water. Not to be forgotten is the diarrhea that develops in some people when given the currently popular gift of a large quantity of raw fruit which they feel must be consumed before it spoils. Each fall I see a number of cancerphobic people who have contracted diarrhea because of an increased intake of raw fruits and vegetables.

Fortunately, postoral-antibiotic diarrhea seldom occurs after administration of penicillin, sulfa, and streptomycin. Also, very fortunately, this condition seems to be less common after use of the new tetracycline compounds (Achromycin, Tetracyn, and Panmycin) than after the oxytetracycline (Terramycin), chlortetracycline (Au-

reomycin), and chloramphenicol (Chloromycetin). The mechanism of this diarrhea is not definitely established, but it may be related to a vitamin deficiency induced by the antibiotics. This theory is supported by changes in the serum vitamin A levels, reduction in the urinary excretion of B₁₂, folic acid, and nicotinamide; deficiency in vitamin B complex and pyridoxine content of the body; and the fact that these diarrheas are so similar to the steatorrhea and clinical picture of sprue which is helped by injectable liver extract. The other and perhaps more prominent theory is a "super-infection" after the normal bacterial flora are greatly reduced by the antibiotic. The change in the flora leaves remaining a preponderance of antibiotic-resistant pathogenic strains of bacteria, yeasts, and mold-like fungi. The new flora may lead to diarrhea or secondary infection which is generally but not always serious. Usually it is a chronic diarrhea of varying degrees of severity with perianal irritation or vulvitis, but all too often we see a much more severe form that does not always occur after prolonged administration of the oral antibiotic. In these instances, severe diarrhea with acute toxic symptoms develops. A pseudomembranous enterocolitis can occur with ulceration of the lining of the gastrointestinal tract and occasionally a sloughing of a large amount of mucous membrane in the form of a cast. In these instances, the predominant organism is frequently a Staphylococcus. The stools should be immediately smeared and studied with a gram stain, and cultures should be taken. If the predominant organism is a gram-positive coccus on the smear, then without waiting for culture and antibiotic sensitivity studies, Erythromycin (Ilotycin) or chloramphenicol (Chloromycetin) should be given by injection or orally. These drugs are given to guard against the possible presence of the Staphylococcus with its frequently potent enterotoxin and perhaps an associated bacteremia. Neomycin should be given orally, if possible, for ulceration of the gastrointestinal tract and then approximately 500 mg. four times daily. Of course, if at all possible, the original antibiotics should be stopped immediately. For the diarrhea, there is some question whether or not the *Lactobacillus* preparations even in the fresh liquid preparations help, and yet, the commercial tablets are used by many. I frequently prescribe buttermilk. Paregoric and the omission of raw fruits and vegetables are, of course, helpful. Correction of dehydration and electro-

lyte imbalance are vitally important measures.

If the studies for organic disease previously discussed are all normal, including x-ray examination of the stomach and the colon, proctoscopic examination, gastric analysis, and adequate stool cultures, then the diarrhea can justifiably be considered to be caused by an irritable bowel. These poor, unfortunate people with irritable gastrointestinal tracts, including gas distress, bloating, belching, increased flatus, gas cramps, and constipation with excessive mucus in the stools often have diarrhea as the only manifestation of this condition or diarrhea alternating with constipation. Frequently these patients have inherited an irritable gastrointestinal tract or, more likely, have inherited a tense, fatigable nervous system; and their keen, intense, hyperactive, and occasionally fragile nervous system enters their gastrointestinal tract, resulting in real distress.

The antispasmodics with all the myriads of preparations have been disappointing to patients and the physicians who prescribe them. Perhaps the most effective drug therapy is a simple, inexpensive sedative like phenobarbital to quiet the nervous system. This is, of course, superseded by general health measures, such as increased rest, vacation, some change of work habits, and, if possible, correction of emotional irritants. A diet omitting coarse, rough foods and the raw fruits and vegetables with highly seasoned or greasy foods is helpful indeed but secondary to the patient's emotional problems. Although the anticholinergic drugs, such as Banthine, Pro-Banthine, Pamine, and so forth, do affect the motility of the gastrointestinal tract, these agents have been disappointing in the control of the irritable bowel with the possible exception of the severe form of irritable bowel, which produces a severe, chronic diarrhea. The psychosomaticists, when generalizing, feel that the person with an irritable bowel with "spastic constipation" or the hard, round-ball stools is often resourceful and capable of handling problems that arise in his life, whereas the person with a diarrheic response to a stressful situation feels more inadequate. Most physicians remember the urinary frequency prior to medical school examinations, and without the problem of an irritable bowel, the all too frequently associated diarrhea. Not always, however, does diarrhea occur in times of stress and strain. On the contrary, this disturbance may develop as a result of an extremely happy or exciting event.

Perennial Problem of Inguinal Hernia

Illustrated with dissections to demonstrate typical anatomic relations at various levels of the inguinofemoral wall.

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THE ADOPTION of the erect posture by man has stretched the anterior wall of the abdomen and augmented the strain upon its caudal attachments. This conceivably resulted in an increase of hernial protrusions in the inguinal region. The story of the development of inguinal hernia may be simple to visualize. The problem it presents is serious; serious enough to justify the witticism frequently quoted that "one good hernia repair is worth much cancer surgery," and "what is cured with the knife is not cancer regardless of how it looks to the pathologist under the microscope."

To perform a rational operation for the cure of inguinal hernia, the surgeon requires certain convictions upon which to base his approach. Such convictions result from the individual surgeon's insight into the pathology and the anatomy, both typical and atypical, of the region. Until he has convictions of his own based upon his personal observations and experience, he must rely upon the conclusions of others. These he derives from books and from study in the dissection and operation rooms. But, both authors and teachers frequently resort to dogma to carry their point to the student. And dogma, though serviceable to the teacher who seeks to provide his student with a basic foundation, is not reliable for the surgeon who aims to succeed when he performs an operation.

The abdominal wall is composed of two thicknesses or parietes, an external and an internal. The external paries consists of subcutaneous fat and covering skin; the internal consists of fascia, muscle, or both, depending upon the location. In the inguinal region, the external paries is soft and spongy, and its fat is contained in several compartments demarcated by lamellae of superficial fascia. The internal paries is much more resilient and is made up of several overlapping fascial sheets with muscle fasciculi between.

The hernia dissects between these various layers and takes different courses depending upon the type and the location of the hernia. The external paries is merely displaced by the hernia after the latter squeezes out through the strata constituting the internal paries.

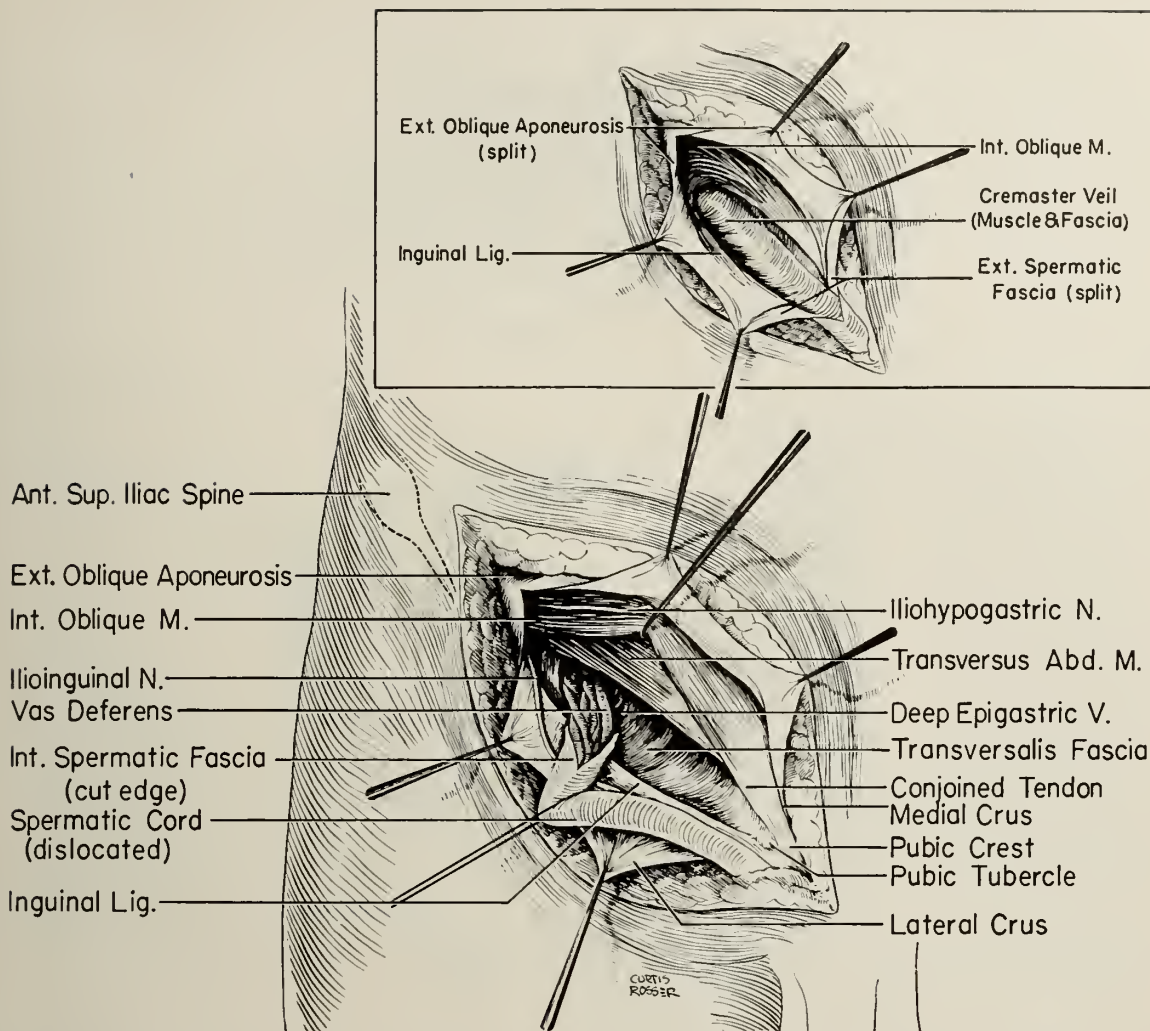
Limited as it may seem, the inguinal region is replete with significant anatomic landmarks. Foremost among these is the major arterial pipeline, the *external iliac artery*. It tunnels its way behind the anterior wall of the abdomen, then passes beneath a fibrous suspension bridge, which it bisects to enter the anterior aspect of the thigh, becoming the *femoral artery*.

True, to the surgical connoisseur, this pipeline is far removed from the actual field of a hernia operation. However, it takes a long time to become a connoisseur in the art of surgery. Until then, one better remember the story of the healthy young man who perhaps could have managed to live on his two legs to a ripe old age with the help of a truss and without surgical intervention. This young man walked into the hospital for the repair of his inguinal hernia. Within a few weeks, the same young man was pushing himself out of the hospital to go home in a wheelchair. One of his legs had to be amputated when it turned black after the hernia repair. . . . Yes, the external iliac artery was clamped and ligated for uncontrollable hemorrhage in the course of the hernia operation.

The next landmark of the inguinal region is the *inguinal ligament*. This fibrous suspension bridge stretches between the anterior superior spine of the iliac bone and the tubercle at the cephalolateral border of the pubic crest. It not only demarcates the abdominal wall from the thigh but also provides anchorage for the external oblique aponeurosis cephalad, the internal oblique and transversus abdominis muscles latero-

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From the service of Dr. O. Tenopir of the Open Surgical Division, Kings County Hospital Center. Illustrations are from the book *Surgical Technigrams* and are loaned by the publishers, McGraw-Hill Book Company, Inc., New York City.



cephalad, the cremaster muscle and fascia medial to that, the transversalis or endoabdominal fascia cephalodorsad, as well as several other structures not particularly pertinent to the repair of inguinal hernia.

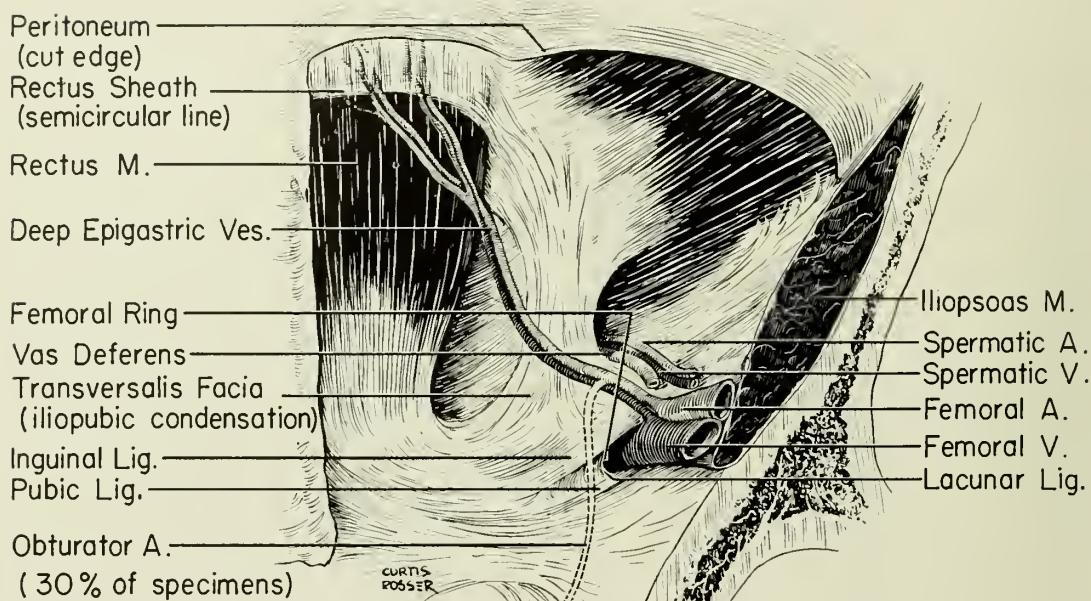
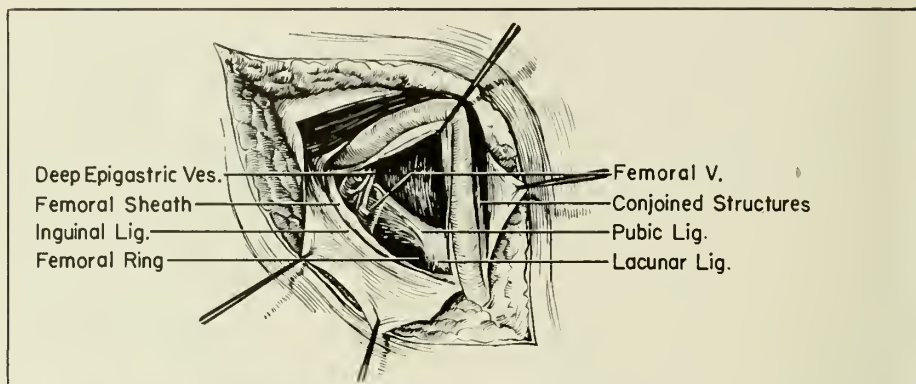
Then a cord, variable both in thickness and structure, may be visualized. This *inguinal cord* arches over the deep epigastric vascular stalk before emerging from the abdominal cavity to enter the anterior abdominal wall. The cord passes through a fibrous cone in the transversalis fascia, the *internal inguinal ring*, which is located above the midpoint of the inguinal ligament. Emerging from this cone, the cord enters the stem of this funnel-shaped arrangement. The stem of the funnel is represented by the *internal spermatic fascia*, which forms the first covering or "undergarment" of the cord.

After passing through the internal inguinal ring, the cord courses medially in an oblique direction and is hidden at the outset behind a

trap-door formed by the overlying border of the internal oblique muscle. This trap-door provides the emerging cord with its second covering, a heavy "sweater" represented by the *cremaster muscle and fascia*. This second covering adds to the thickness of the cord and advances with it toward the superficial window through which the cord ultimately emerges from the abdominal musculofascial wall to enter the subcutaneous fatty compartment on its way to the labia majora or the scrotal sac as the case may be.

The cord, now thickened both by the internal spermatic fascia and the cremaster muscle and fascia, emerges through an aperture in the overlying external oblique aponeurosis, the *external inguinal ring*, which is located over the pubic insertion of the inguinal ligament. From this outermost layer of the abdominal musculofascial wall, the cord receives its third and final covering, its "overcoat" of *external spermatic fascia*.

The *internal oblique muscle* is attached to the

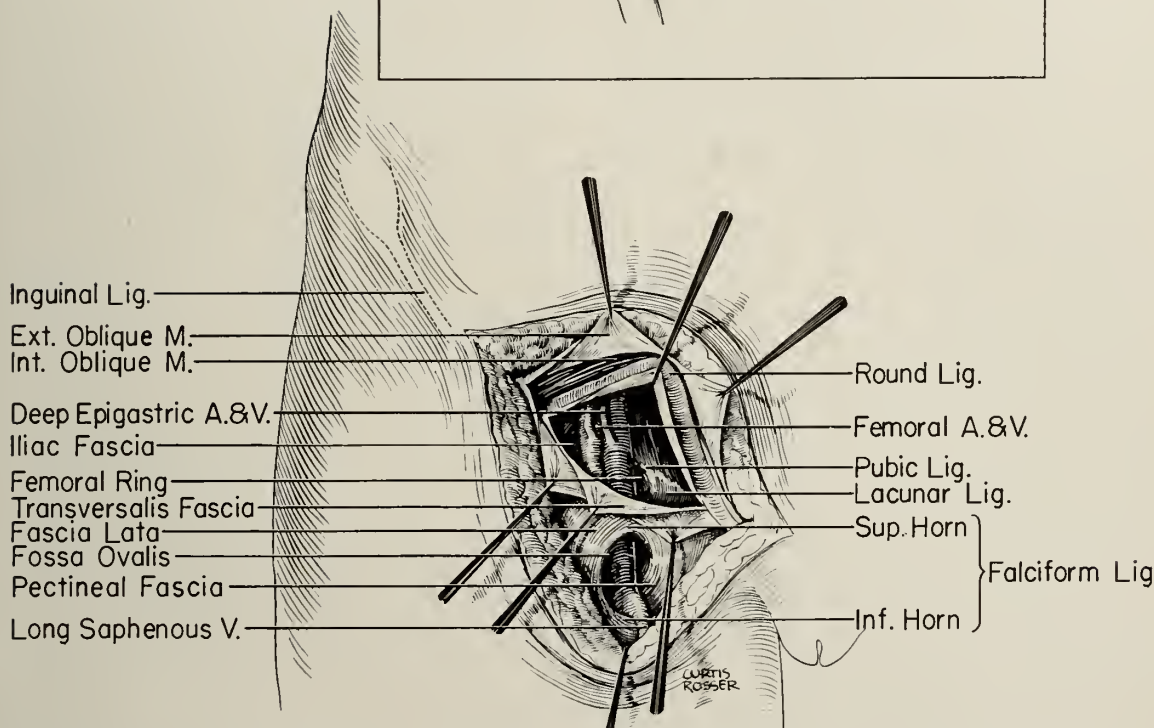
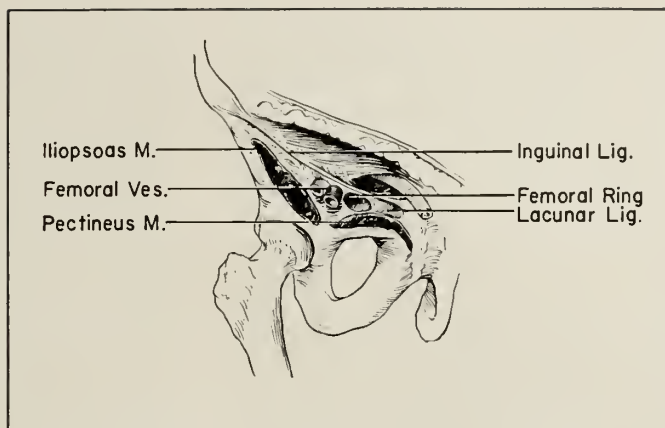


lateral half of the cephalic surface of the inguinal ligament. As it arches forward to permit the inguinal cord to emerge, it is joined by the caudal border of the *transversus abdominis* muscle, which runs almost in a parallel direction. The two borders ultimately fuse medially to form the *conjoined tendon*, which swings forward to attach to the pubic arch, forming the caudal extremity of the posterior leaf of the anterior rectus fascia.

This is approximately the topographic map which the young surgeon carries with him to the operation table when he contemplates the repair of an inguinal hernia. The picture is rigidly clear in his mind, and, accordingly, his mind is made up concerning the type of repair he is to institute, providing he found the type of hernia, direct or indirect, he had anticipated. The repair he has in mind could be a Bassini, a Halsted, a Ferguson, or a modification of any of these operations. Or, the repair may be one of many procedures frequently revived and popularized

from time to time at different institutions.

But while a preconceived plan of repair is "all right," it also is wrong, since the premise upon which the repair was preconceived was not all right. The transversalis fascia which forms the floor of the inguinal triangle, for instance, is not always the tough dependable sheet of fibrous tissue the student learned about in school and saw demonstrated on a young robust cadaver in the anatomy laboratory. As a matter of fact, the picture the novice visualized is rarely encountered during an adult hernia repair unless the patient is a female in whom a healthy transversalis fascia is exposed and incised in an inguinal approach for the repair of an irreducible femoral hernia. Yes, the transversalis fascia is tough in the young, but, in these patients, it is seldom exposed during a hernia operation. In the adult, however, no two transversalis fasciae are alike. The thickness and the consistency of the endoabdominal sheet varies considerably from patient to patient. When atrophied, as is



often the case, the fragmentation of its fibers takes various patterns as it disintegrates into many condensations or tracts, such as the ilio-pubic, parainguinal, interfoveolar, and others.

Then again, the cremaster muscle and fascia are commonly described as one layer composed of a fascial membrane interspersed with muscle fibers. Yet nothing is more removed from the truth, for this anatomic entity varies considerably both in texture and in composition. The surgeon cuts into and picks up this covering in an effort to bare the cord, only to find another layer of the same musculofascial type and still another cremasteric layer until the cord stands naked in its intimate undergarment of internal spermatic fascia. The first cremasteric stratum may be an extension of the internal oblique, and the second may come from an accessory internal oblique muscle. The third stratum may be a continuation of a low ending transversus abdo-

minis muscle. From where did the fourth stratum of cremaster originate?

Finally comes the outermost covering of the inguinal wall, the aponeurosis of the external oblique muscle, which is usually fibrous and tough, . . . but where is it? Only scattered fibrous threads remain — shreds representing the oblique aponeurotic fibers, crisscrossed with remnants of the intercolumnar fibers. The external inguinal ring and the medial and lateral crus are difficult to discern. Everything is ill defined with atrophy and infiltrated with deposits of fat.

Overlying the entire wall are the several layers of subcutaneous fat, with the superficial fasciae between. These too may vary both in location and in consistency. One layer may be so hypertrophied that it simulates the external oblique aponeurosis itself, as though nature had deliberately permitted its hypertrophy to guard the hernia against further protrusion.

With such extremes of anatomic variation, how can the surgeon advance to the operation table and embark upon a preconceived plan of repair? How can he count on the transversalis fascia or any of its condensations to reconstruct the internal inguinal ring, for instance, when it has become surgically nonexistent through atrophy? How is he able to suture a flimsy conjoined tendon to the shelving edge of the inguinal ligament when it readily tears upon puncture with the suturing needle? How can the surgeon produce a pedicled flap from the posterior leaf of the anterior rectus fascia with which to patch up a defective inguinal floor when the internal oblique muscle fasciculi extend almost to the midline and no rectus fascia is available? How can he embark upon his favorite McVay technic when the entire inguinal floor is intact? Certainly, to expose the pubic ligament for the McVay operation would only compromise the inguinal floor, and whatever repair is ultimately instituted may not compensate for the tissue disruption necessary to expose the concealed pubic ligament! How can the surgeon seek an ilio pubic condensation or tract to bring down to the inguinal shelf when the search would only weaken an already atrophied transversalis fascia and no substitute for the reinforcement of the wall lies in sight?

These are but a few of the anatomic variations of the inguinal wall that take place both congenitally and with age. These are the problems that ultimately confront the surgeon after his preliminary dissection. At that time, not before the operation, he can assess the reparative worth of whatever lies before him and make use of the structures as he finds them, in order to establish the repair he set forth to institute in all its detail. The teacher and the author may be permitted to indulge in dogma through established license, but the surgeon cannot afford to do so and still maintain his good work.

For this reason the academician and the surgeon ultimately must part company in their approaches to the study of regional anatomy. The surgeon soon learns to view anatomic structures and pathologic conditions as he finds them and not as he preoperatively visualized them. For, while the academician deals with the typical, the surgeon must grapple with the actual, frequently atypical, and remain constantly alert to cope adequately with the condition at hand. Only in this manner can he best serve his patient and practice his art to the gratification of his own soul.

With surgical maturity comes the realization that only the blood vessels, inguinal ligament,

and bony prominences are the constant landmarks of the inguinal region. All else — tendons, muscles, and fasciae — vary within wide ranges depending upon age, sex, and physique. Once this is fully appreciated, the student begins to understand the reason for the multiplicity of technics employed for the repair of inguinal hernia and why no single technic is applicable in toto in every case. Sooner or later the surgeon begins to classify inguinal hernias, not only into direct and indirect as is the custom, but also into inguinal hernias of children and those of the adult. He learns to approach the operation table not to perform a specific operation but to view the operative field. Only after he has observed and thoroughly appraised all relevant structures, may he proceed to the job of repair.

Perhaps in a child in whom the anatomy scarcely varies and the hernial sac is almost always a patent processus vaginalis or a canal of Nuck, as the case may be, the repair of an inguinal hernia may simply consist of ligating the sac and resuturing the inguinal structures in their normal relations. But, in the adult, the operation must be divided into two distinct procedures. The first requires meticulous dissection, for reconnaissance so to speak. After orientation as to type of sac or sacs and assessment of the condition and worth of any structures that may have been spared disruption and atrophy, a definitive plan of repair is formulated and followed through until established.

For this purpose, the surgeon does not learn one or two or three types of repair, but he must be fully conversant with the basic approach of every repair and ready to utilize it as originally performed or modify it as suits the case at hand. For, similar as adult inguinal hernias may seem through the expedient of classification into direct and indirect, if examined carefully, they are found to vary from one patient to another. And, if the structures are atrophied beyond recognition or redemption and the defects are too extensive to close with available structures, the surgeon may call upon such foreign substances as tantalum mesh, bone dust, ox fascia, kangaroo tendon, and dermal or other types of grafts for use as a buttress for the wall. However, with fine dissection, thorough evaluation, and wise application, a virgin hernia is always amenable to repair with the structures that are finally salvaged and without use of any foreign substance other than the least irritating sutures of the type most suitable for the particular purpose.

In the adult, after the external oblique aponeurosis is bared and split, and the nerve that crosses the cremaster veil is isolated and re-

tracted, the inguinal field is immediately "unveiled" by excision of the several layers which constitute the cremaster muscle and fascia. This is done by lifting this stratified structure with forceps and incising it at the border of the conjoined tendon. As one turns laterad to separate the veil from the arching fasciculi of the conjoined muscle, the veil is double clamped and cut down to the inguinal ligament. The clamps prevent bleeding from the cremaster vessels, branches of the terminal intercostal vessels which supply the internal oblique muscle and continue with the cremaster into the scrotum.

When the inguinal ligament is reached, the veil can be readily scissored off the inguinal shelf, with care, in order not to injure any accessory spermatic vessels which occasionally perforate the inguinal floor to enter the cord. The dissection of the cremaster veil is carried down to the pubic arch and past the boundaries of the external inguinal ring. Its scrotal extension is clamped in two or three sections, ligated, and forgotten. By then the cord is bare beyond its intimate undergarment of internal spermatic fascia and available for dislocation from its bed, if necessary.

If the inguinal floor feels strong, the cord is not disturbed. The conjoined muscle — the internal oblique and the accessory internal oblique, when present, or the transversus abdominis muscle fasciculi, when low — is retracted cephalolaterad to expose the internal inguinal ring. Next, the internal spermatic fascia is lifted and incised between forceps over its "peritoneal angle," which lies to the cephalomesial aspect of the ring lateral to the deep epigastric vessels. The cut edges of the fascia are reflected, and the indirect inguinal sac, always found there, is picked up and attended to.

If a bulge occupies the floor of the inguinal triangle, the cord is dislocated from its bed and retracted beyond the two clamps applied to the laterocaudal flap of the external oblique aponeurosis. The overstretched transversalis fascia is incised, and the properitoneal or perivesical fat is reflected until the hernial sac is located. The sac is opened and the finger is introduced into the peritoneal cavity to explore the inguinal floor from behind. The resilience of the floor is determined, and other possibilities, such as direct or femoral sacs, are checked. By then all pertinent facts have been determined, the local structures evaluated, and a definitive plan of repair has already crystalized in the surgeon's mind. The transversalis fascial cone may be trimmed by an elliptical incision and the attenuated excess fascia removed. The bladder is re-

flected, the peritoneum is bared, and the resulting sac is excised and closed. Next, the cut edges of the transversalis fascia are approximated. The balance of the repair is consummated with the structures available to reinforce the outer inguinal wall after the cord is repositied into its bed.

If the bulge over the inguinal triangle is noted merely to be a general weakness of the floor foundation and no direct hernia is discovered, the peritoneal cavity may be entered at the peritoneal angle of the cord. This is easily accomplished by applying traction to the uncovered cord, thus extruding the peritoneum over its peritonealized cephalomesial aspect. Then, the conjoined muscles are retracted laterally, the deep epigastric vessels medially, and the peritoneum is picked up and opened between forceps. Clamps are applied to the cut edges of peritoneum, and the finger is introduced to explore the inguinal floor from behind, as well as to check the presence of additional sacs. If none are discovered, the peritoneum is liberated around, excess excised, the opening closed, and the stump dropped back. The overstretched and atrophied transversalis fascia is plicated by invagination.

The suture is begun by tightening the internal inguinal ring to close snugly around the emerging cord, being careful not to puncture the subjacent deep epigastric vessels. The invaginating suture is continued medially between the remaining fibers of the iliopubic and the parainguinal condensations of the transversalis fascia with, preferably, nonabsorbable sutures. The nonabsorbable sutures invite reinforcement of the floor by the usual fibrosis which envelops nonabsorbable sutures. The inguinal cord is dropped back, and the superstructure of the inguinal wall is reinforced by any of the several methods in vogue as dictated by the condition of the supporting structures. If necessary, the rectus fascia may be incised transversely at several levels to relieve tension and to facilitate descent of the conjoined tendon. Or, a fascial flap may be fashioned, when possible, out of the posterior leaf of the anterior rectus fascia and used to reinforce the inguinal floor.

The necessity of transplanting the inguinal cord, spermatic or uterine (round ligament), subcutaneously seldom arises. This procedure is not permissible unless the external oblique aponeurosis is the only way by which the inguinal wall can be reinforced. For, superimposition of both inguinal rings, internal and external, over the midpoint of the inguinal ligament invites a direct inguinal hernial recurrence

through the weakened and unprotected direct outlet between the two superimposed inguinal rings.

SUMMARY

The operation of inguinal herniorrhaphy, simple as it may seem, must be performed with great care and discrimination. In the adult particularly, the operation must be divided into two chapters. Part one deals with meticulous dissection of the entire operative field. Part two is devoted to deliberate and well-planned re-

construction of the inguinal wall. Exeision of the "cremaster veil" unfolds the inguinal field and permits perfect apposition of the reconstructed wall surfaces without the interposition of cremaster tissue. The preference of custom-planned repair to mass-production techniques in adult herniorrhaphies is stressed. The wise counsel of Theodorie, the great master of thirteenth century fame, could not be heeded to better advantage than in a hernia operation: "Under all circumstances the surgeon must operate with the greatest deliberateness and gentleness."

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THE L-TARTRATE METHOD of determining acid phosphatase of prostatic origin is more reliable as a test for prostatic cancer than is measurement of total serum acid phosphatase, according to Gordon Mathes, M.D., Sara Grace Richmond, and Douglas H. Sprunt, M.D., University of Tennessee and City of Memphis hospitals.

Of 16 patients who had prostatic carcinoma with metastases and who were receiving stilbestrol therapy, 80 per cent had serum prostatic acid phosphatase levels of 0.8 King-Armstrong units or more; the total acid phosphatase was elevated in only 43 per cent. Of 10 patients who had carcinoma without metastases and who were not receiving hormones, 80 per cent had high prostatic acid phosphatase, and only 50 per cent had elevated total serum acid phosphatase.

Prostatic phosphatase levels were elevated in all of 6 patients with untreated carcinoma of the prostate and metastases. In contrast, total and prostatic acid phosphatases were elevated in only 2 of 17 patients who had localized prostatic carcinoma which was controlled by hormones.

Prostatic acid phosphatase levels were no higher than 0.8 King-Armstrong units in 98 per cent of 394 patients without prostatic disease and in all of 70 patients with benign prostatic hypertrophy.

GORDON MATHES, SARA GRACE RICHMOND, and DOUGLAS H. SPRUNT: J. Urol. 75:143-150, 1956.

Modern Concepts in the Treatment of Leukemia

WILLIS M. FOWLER, M.D., and
WILLIAM P. JOLLY, M.D.

Iowa City, Iowa

ALTHOUGH the etiology of leukemia is not known and treatment is far from specific, some inroads in the attack on this disease have been made. Some of the many therapeutic agents which have been tried in an attempt to stem the progress of this disease have stood the test of time and others appear promising. The skillful use of these agents may provide added weeks, months, or years of relatively normal existence to victims of the disease, but an understanding of the attributes and limitations of each of these therapeutic tools is necessary for its proper use. Since no treatment will cure leukemia, the general aims of therapy today are to arrest the progress of the disease and palliate the symptoms.

Much of the experimental work currently in progress involves two general groups of chemotherapeutic agents; namely, cytotoxic agents and antimetabolic drugs. The cytotoxic agents exert their effects by destroying rapidly proliferating cells, whereas the antimetabolites inhibit cell division by interfering with intracellular enzyme systems and nucleic acid synthesis.

Two approaches to the problem are being used. The first method involves a screening process in which drugs are tested for their effect in decreasing cellular division and growth. The second approach is an evaluation of substances which *selectively* influence the growth and development of leukemic cells without disturbing normal cells. Although many agents are available which will destroy leukemic cells, none do so without fatally injuring the host. To date no significant *qualitative* differences between normal cells and leukemic cells, which would aid this problem, have been found.

Table 1 lists the various measures available for the management of patients with leukemia.

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Remissions in leukemia may be complete or partial. If clinical symptoms disappear and hematologic findings return to normal, a complete remission has been attained. If clinical improvement is noted without concomitant improvement in hematologic values, remission is partial. It should be noted that criteria for remissions vary greatly among authors.

Clinical remissions involve symptomatic improvement, such as disappearance of fever; improvement in general well-being, weight, and appetite; regression of enlarged organs; disappearance of bone pain; healing of mouth ulcers; and improvement of the hemorrhagic tendency.

Hematologic remissions are evidenced by return of blood values toward normal, qualitative and quantitative improvement of peripheral leukocyte counts, and alteration of the bone marrow toward normal.

CHRONIC LEUKEMIA

Chronic lymphocytic leukemia. The keystone of treatment in this condition is external radiation. Indications for therapy include loss of weight, progressive anemia, increasing fatigue, pressure symptoms from an enlarged spleen or lymph nodes, pain or disfigurement due to infiltrative lesions, rapidly increasing leukocyte count, or hemorrhagic manifestations. Institution of therapy for a high leukocyte count alone is not necessary. Ordinarily, however, symptoms are present as leukocytes increase. Because he feels that the likelihood of early relapse is high when the leukocyte count surpasses a level of 40,000, Murphy¹ advocates treatment when this value is reached. Sturgis² prefers to treat all patients with leukocyte levels above 100,000, regardless of symptoms. He justifies this philosophy by stating that results are better if patients are not allowed to relapse too far and that such a count indicates early relapse. Osgood and associates³ advocate therapy with "titrated" radioactive

From the department of internal medicine, State University of Iowa hospitals, Iowa City, Iowa.

TABLE 1
AGENTS AVAILABLE FOR THE TREATMENT OF LEUKEMIA

<i>Irradiation</i>	
	Roentgen rays
	Radioactive isotopes — radioactive phosphorus (P^{32})
<i>Chemotherapy</i>	
Radiomimetic agents	
	Nitrogen mustards (HN_2) (mechlorethamine)
	Triethylene melamine (TEM)
	Triethylene phosphoramide (Tepa)
	Triethylene thiophosphoramide (Thio-tepa)
Cytotoxic substances	
	Myleran
	Urethane
	Colcemide
	Fowler's solution
Antimetabolites	
	Folic acid antagonists
	Aminopterin
	Amethopterin
	Amino-an-fol
	Purine antagonists
	6-mercaptopurine (6-MP)
	Azaserine (not available commercially)
	Azaguanine " " "
Endocrine substances	
	cortisone
	Prednisone
	ACTH
<i>General measures</i>	
	Transfusions
	Antibiotics
	Analgesics

phosphorus or external irradiation in all patients in an effort to keep the leukocyte level at $15,000 \pm 5,000$.

Our method is to treat patients with chronic lymphocytic leukemia who exhibit symptoms. The leukocyte count is of secondary importance. In general, patients with high leukocyte values are symptomatic.

No universal method of irradiation is used. Our general plan is to administer external radiation in amounts sufficient to control symptoms or until a falling leukocyte count precludes further treatment. If the spleen is not grossly enlarged and if no symptomatic lymph node masses are present, total body x-ray in doses of 5 to 15 r daily for three or more days is given. If such enlarged organs are present, spot x-ray is directed at these organs, usually in doses of 50 to 100 r per day. Treatment is ordinarily stopped as the leukocyte level reaches two-thirds of its initial value. Subsequent courses of treatment may be necessary on follow-up visits. Sturgis continues treatment until the white blood cell count falls to 40,000 in patients with an initial high level. Further fall in leukocytes may be expected for several days after treatment is stopped.

The response to roentgen therapy is often

striking in the early phases of the disease. Masses of abnormal lymphocytic tissue melt away rapidly under ionizing radiation. Repeated courses of treatment may be given with good results, but gradually the patients become less responsive. In patients who respond, the sense of fatigue may rapidly disappear as nodes regress in size, the leukocyte count decreases, and the anemia is corrected. Remissions may be prolonged, but some patients require frequent courses of treatment. Daily white blood counts should be taken during treatment and for a few days afterward.

Radioactive phosphorus (P^{32}) has been extensively used by some physicians in the treatment of chronic lymphocytic leukemia.^{3,4} Its mechanism of action is identical to that of external radiation. Because of the simplicity of external irradiation, the lack of evidence of any unique advantage of P^{32} , and the more pronounced depressant effects of P^{32} upon the myeloid and erythroid elements of the bone marrow, we prefer external radiation in the treatment of this disease. The general precautions pertaining to external irradiation apply to P^{32} .

With one exception, irradiation in any form is contraindicated in acute lymphocytic leukemia or in an acute exacerbation of the chronic type. Occasionally, in such cases, external radiation in small amounts may be necessary to treat enlarged masses of lymph nodes or organs which are producing distressing local symptoms. Irradiation should be used cautiously if either leukopenia or thrombocytopenia is present. If the patient is extremely anemic, whole blood transfusions should be given prior to or with roentgen therapy.

The nitrogen mustards have been found to be effective agents in some patients with chronic lymphocytic leukemia but, in general, are inferior to irradiation. Methyl-bis (beta-chloroethyl) amine hydrochloride (HN_2) (mechlorethamine) produces good results, but a related compound, triethylene melamine (TEM) has gained great favor in recent years. Dameshek and associates³ prefer TEM to irradiation, and others feel that it is an excellent alternative form of therapy in treating these patients. In our opinion, HN_2 and TEM are most effectively employed in patients presenting systemic manifestations, such as fever, weight loss, loss of appetite, and so forth. We ordinarily do not use these agents in patients whose greatly enlarged lymph nodes produce predominant symptoms, unless they have become refractory to radiation.

Patients with chronic lymphocytic leukemia often are extraordinarily sensitive to these agents.

Doses of 0.2 to 0.4 mg. per kilogram of body weight of mechlorethamine intravenously, or 2.5 to 5.0 mg. of TEM orally may be sufficient to produce a remission. As much as 25 mg. or more of TEM may occasionally be given in a single course. Ordinarily smaller doses are needed than in malignant lymphomas. The drugs are usually given in courses, but occasionally maintenance therapy with TEM may be of value. The principal toxic effects are due to bone marrow depression which may occur several weeks after administration of the drug.

Other drugs of the nitrogen mustard family such as triethylene phosphoramide (Tepa) and triethylene thiophosphoramide (Thio-tepa) are sometimes of value. Occasional patients, who are refractory to other forms of treatment, respond to these drugs.⁵ Thio-tepa is given in intravenous or intramuscular injections of 2, 5, or 10 mg. The total dose varies widely. As with other compounds of this type, such as HN₂ and TEM, bone marrow depression is the chief toxic effect. Great care should be employed when the drugs are used in patients with leukopenia or thrombocytopenia.

A severe acquired hemolytic anemia is occasionally encountered with chronic lymphocytic leukemia. Steroids, such as cortisone in doses of 100 to 300 mg. per day or prednisone in doses of 10 to 100 mg. per day orally, are usually effective in controlling this complication. ACTH in doses of 80 mg. per day intramuscularly or intravenously may also be used. Rarely, splenectomy may be necessary to counteract the hemolytic tendency.

Drugs which are contraindicated in chronic lymphocytic leukemia are folic acid antagonists, 6-mercaptopurine, Myleran (1,4-Dimethanesulfonxybutane), and Colcemid (desacetylmethylcolchicine) (demecolcin). Urethane (ethyl carbamate) is of no value.

Chronic myelocytic leukemia. External irradiation remains the treatment of choice in most of these cases. The indications for therapy are essentially the same as in chronic lymphocytic leukemia: namely, increasing fatigue and weakness, enlargement of the spleen or liver, rising leukocyte count, progressive anemia, or hemorrhagic symptoms.

There is no uniform procedure for the use of x-ray. Sturgis prefers total body irradiation except in patients with grossly enlarged spleens, in which case spot irradiation is directed at the spleen. In most of our cases, a combination of total body irradiation and splenic irradiation is given. Dosage is similar to that in chronic lymphocytic leukemia, with the total dose deter-

mined by response of the patient. The higher the initial count and the higher the percentage of immature cells, the more rapidly the leukocyte count falls. Treatment should be discontinued before the count reaches normal, as a severe leukopenia may otherwise develop within a few days. A relatively low initial count or an aleukemic state is not a contraindication to therapy, but irradiation should be administered cautiously. A significant fall in hemoglobin, erythrocytes, or platelets is an indication to stop treatment.

The best response to irradiation is obtained during the first exposure, and progressively less effect is to be expected with subsequent treatment. Duration of remissions depends on the acuity of the disease and may last a few weeks or several years. Subsequent therapy should be governed by the return of symptoms, not necessarily by the leukocyte count.

An alternative form of radiation therapy in chronic myelocytic leukemia involves the use of radioactive phosphorus (P³²). The advantages of P³² are ability to widely disperse tissue, prolonged effect, and relatively high selective uptake by rapidly growing leukemic tissue and bone. The chief disadvantage is that overdosage may produce serious or fatal bone marrow depression. Because of this feature, we prefer external radiation in most cases. The half life of P³² is 14.3 days. B particles are emitted which have a maximal range in tissue of 8 mm. with an average range of 2 mm. One millicurie of P³² is equivalent to approximately 6 r of external radiation. The usual dose is 5 to 30 mc. Lawrence feels that 1 to 2 mc. per week for four to eight weeks usually produces a remission. Sturgis prefers to give 5 to 7 mc. every four to six weeks until the desired effect is obtained or toxic symptoms intervene. Treatment is stopped when the leukocyte count falls to 40,000. The indications and contraindications for treatment are the same as with external radiation.

Chemotherapy has assumed an increasingly prominent role in the therapy of chronic myelocytic leukemia. Of the several drugs now available, Myleran seems most desirable. Its cytotoxic action is unique in that it appears to be limited to the bone marrow. Haut and associates⁶ state that results with Myleran are as good as with radiation. The patients' symptoms ordinarily improve within two or three weeks after the drug is started. Doses of 2 to 24 mg. orally per day, an average of 4 to 6 mg., usually produce a remission. These authors have given the drug in courses of 40 to 90 days, the total dose varying from 84 to 850 mg. Galton and Till⁷

have used both intermittent and maintenance therapy. In the latter method, the objective is to keep the leukocyte count between 10,000 and 20,000 cells per cu. mm. When intermittent therapy is used, repeated courses may be given. A higher dose is often needed with each subsequent course. As many as 4 remissions have been reported in the same patient. Leukocyte and platelet counts, as well as hemoglobin levels, every two to three days are the best guides to treatment. Efficacy of therapy is better indicated by the hemoglobin level, the spleen size, and the general well-being than by the leukocyte count. The toxicity of the drug is low. Although platelets are decreased in one-third of the patients, significant bleeding on this basis is rare if dosage is adjusted or treatment stopped before a pronounced thrombocytopenia develops. In such instances, the platelet count usually rises within four to five days after cessation of treatment. Bone marrow hypoplasia is rarely encountered. We have not observed significant toxic effects other than the effects of the drug upon the bone marrow.

Urethane is effective in the treatment of chronic myelocytic leukemia, but its use has been limited by its higher toxicity. Urethane is given in oral doses of 1 to 4 gm. Maintenance or intermittent methods of treatment may be used. Remissions may occur within four to seven weeks. Nausea and vomiting, diarrhea, and bone marrow depression are the most frequent toxic signs. One instance of glomerulonephritis and 2 cases of centrilobular hepatic necrosis have been attributed to Urethane. Both Myleran and Urethane may be utilized in conjunction with irradiation in an effort to maintain a remission.

Colcemide, a derivative of colchicine, has recently been advocated for the treatment of chronic myelocytic leukemia.⁸ It is a specific depressant of the granulocytic series. Platelet depression is said to occur infrequently, and other toxic effects are insignificant. Dosage is 3 to 10 mg. per day depending on the leukocyte count. Our experience with this drug has been limited, but Myleran seems more effective.

Fowler's solution (potassium arsenite) produces remissions similar to irradiation in chronic myelocytic leukemia and has been used in conjunction with radiation therapy. Its use has been limited by the troublesome toxic symptoms it produces and by the early relapses which follow cessation of the drug.

In the early stages of chronic myelocytic leukemia, nitrogen mustards and TEM produce remissions lasting many months. Later the leukocyte values may fall but clinical symptoms do

not improve. In general, these agents are less effective than irradiation or Myleran.

For the acute blastic stage of chronic myelocytic leukemia, 6-mercaptopurine has proved to be the best therapeutic agent. It is also quite effective in earlier stages of the disease. Dosage is usually 2.5 mg. per kilogram of body weight per day. Toxicity is rare even at a dosage range of 100 to 200 mg. per day.

Anemia and thrombocytopenia are relatively common in late stages of chronic myelocytic leukemia. For control of anemia and hemorrhage, steroids and ACTH in doses similar to those for chronic lymphocytic leukemia are often valuable. Transfusions are also extremely important in this regard.

Chronic monocytic leukemia. Since most cases of recognized monocytic leukemia take the acute form, the chronic form is rarely diagnosed. Treatment is usually by external irradiation, which is administered similarly to that in other chronic leukemias. Results in general are somewhat poorer than in other chronic leukemias. When irradiation fails, Urethane may be worthy of a trial. In rare instances, arsenic in the form of Fowler's solution has been used. Agents of value and those contraindicated, according to the type of leukemia being treated, are found in table 2.

ACUTE LEUKEMIA

Management of patients with acute leukemia is much less satisfactory than is that of patients with chronic leukemia. In spite of the introduction of a number of new chemotherapeutic agents, used singly or in combination, the number of complete or prolonged remissions is depressingly low. It is doubtful if life itself has been prolonged in most patients.⁹ The principal advance has probably been in amelioration of symptoms as the disease progresses.

Transfusions and antibiotics have been found to be valuable agents in the therapy of all types of acute leukemia. Antibiotics often are very effective in combating the localized and generalized infections so common in leukemic patients. This result alone has probably contributed significantly to the relative well-being of patients.

Blood transfusions are considered by most students of the disease to be helpful adjuvants to management of leukemia through their corrective effects on the secondary anemia. Hayhoe and Whitby,¹⁰ however, have attributed a specific antileukemic action to multiple transfusions. These authors note that remissions develop in one-third of patients treated only with transfusions. Acute lymphocytic leukemia is said to be

TABLE 2
THE TREATMENT OF LEUKEMIA

<i>Chronic leukemia</i>	<i>Treatment of choice</i>	<i>Other agents of value</i>	<i>Contraindicated</i>
Lymphocytic	External irradiation	P ³² , HN ₂ , TEM, Thio-Tepa, transfusions	FAA ^o , 6M-P, Myleran, Colcemide, Urethane
Myelocytic	External irradiation	P ³² , Myleran, Colcemide, 6M-P, urethane, HN ₂ , TEM, transfusions	
Monocytic	External irradiation	Urethane, Fowler's solution, transfusions	
<i>Acute leukemia</i>			
Lymphocytic	6M-P or FAA ^o ± steroid	Transfusions	<div> <div>Irradiation (except locally)</div> <div> P³² TEM HN₂ Colcemide Fowler's solution Urethane Tepa Thio-Tepa Myleran </div> </div>
Myelocytic	6M-P or FAA ^o ± steroid	Transfusions	
Monocytic	6M-P or FAA ^o ± steroid	Transfusions	

^oFAA = folic acid antagonist

the variety most likely to respond to this therapy. Tivey¹¹ has postulated that the mechanism of remissions from replacement transfusions may be due either to direct transfer of ACTH and/or steroids or, more possibly, a stimulus for its endogenous production in the recipient.

The use of steroids (cortisone, prednisone) and ACTH in acute leukemias is of value, particularly when symptoms are severe. Their well-known properties of decreasing fever, alleviating hemorrhagic symptoms, and increasing appetite and general well-being are used to good advantage in relieving the critically ill leukemic patient of his distressing difficulties. Their rapid action is often utilized to provide immediate relief until the slower acting antimetabolites exert their effects. Steroids are said to be most successful in producing remissions in acute stem-cell leukemia and much less successful when cells have differentiated past the blast stage.¹² While Fessas and associates¹³ and others concur in the use of these drugs in acute lymphocytic leukemia, they question the value of these compounds in the acute myelocytic and acute monocytic varieties. They wonder if the latter two types of leukemia might not even be accelerated after steroid administration. In spite of these objections, the steroids have proved of value in producing remissions in patients with acute lymphocytic leukemia and in symptomatic relief of all patients with leukemia.

Two general varieties of antimetabolites are in general use today in treating leukemia. Folic acid antagonists, such as aminopterin (4-aminopteroylglutamic acid), amethopterin (methotrexin or 4-amino-N¹⁰-methylpteroylglutamic acid), and amino-an-fol (4-aminopteroylaspatic acid)

are particularly effective in the treatment of acute leukemia in children but are much less effective in adults. They are structurally related to folic acid which enables them to block the actions of folic acid in nucleic acid metabolism and cytopiesis. They have been shown specifically to inhibit the conversion of folic acid to folinic acid (citrovorum factor), which is a necessary step in the utilization of folic acid by the cell. These agents do not prevent cells from entering mitosis but rather arrest mitosis in the metaphase.

Of many drugs recently synthesized which interfere with nucleic acid biosynthesis, 6-mercaptopurine has been the most efficacious. This agent appears to be at least as valuable as folic acid antagonists in acute leukemia in adults. Toxicity is quite low, which makes it preferable to folic acid antagonists in many instances. 6-mercaptopurine acts by antagonizing adenine and hypoxanthine, thus interfering with nucleic acid synthesis. Many other drugs which interfere with intracellular metabolism have been tried, but to date none seem superior to 6-mercaptopurine.

Acute lymphocytic leukemia. The use of steroids and antimetabolites, either alone or in combination, is advocated at present in the therapy of acute lymphocytic leukemia. The choice of drugs depends to some extent upon the severity of symptoms and upon the physician's previous experience.

Fessas and associates¹³ evaluated the use of cortisone and corticotropin alone in acute leukemia. They found that these drugs produced a high percentage (70 per cent) of remissions in children less than 10 years of age but were

much less effective in older patients. Beneficial effects appeared promptly, and, in most cases responding to treatment, evidence of a favorable response could be seen during the first week of therapy. Blood values returned to normal by the fourth or fifth week if no complications developed. Treatment was usually stopped after a complete remission was obtained. When second and further courses of steroids were given, remissions were less frequent and of shorter duration. These authors¹⁴ later advised that cortisone be administered initially and then replaced with amethopterin after complete remission was obtained.

After extensive experience in treating acute leukemia in children, Burchenal and associates¹⁵ found that remissions in patients treated with 6-mercaptopurine lasted from one to twelve months, generally longer than with the steroids but somewhat shorter than with amethopterin. They believe that the antimetabolites, amethopterin, or 6-mercaptopurine should be the mainstay of treatment, keeping the hormones in reserve for emergency situations in which the disease has become resistant to antimetabolites or in which time does not allow use of the slower acting antimetabolic drugs.

Hayhoe and Whitby¹⁶ reported their results in the treatment of acute leukemia in adults. Best responses to therapy in their series followed multiple blood transfusions. Cortisone constituted their second method of attack. The anti-leukemic factor of transfusions was felt to be contained in the plasma, but its exact nature was not determined. Favorable responses to other agents were negligible.

Remissions in adults with acute lymphocytic leukemia treated with 6-mercaptopurine, as with other agents, have been infrequent. Only 4 of 18 adults treated by Burchenal and associates¹⁶ with this drug experienced remissions.

There appears to be no cross tolerance among folic acid antagonists, 6-mercaptopurine, and steroids. The use of the three classes of agents together seems to offer no more likelihood of producing a remission than their sequential use.

Due to its lack of toxicity as compared to folic acid antagonists, 6-mercaptopurine is the antimetabolite of choice in most cases of acute lymphocytic leukemia in adults. We prefer to initiate treatment in acutely ill patients with both steroids and 6-mercaptopurine. If the patient is less severely ill, 6-mercaptopurine may be given alone. Whereas two or more weeks may elapse before the effects of 6-mercaptopurine are evident in most patients, beneficial results are sometimes noticed within several days. As

the patient responds and the effect of 6-mercaptopurine appears, the steroid (usually cortisone or prednisone) is gradually tapered off. 6-mercaptopurine is maintained in doses large enough to perpetuate the remission but small enough to avoid excessive bone marrow depression. Second remissions with 6-mercaptopurine are infrequent; consequently, sufficiently high maintenance doses are of extreme importance in an attempt to prevent early relapse. In doses of 2.5 mg. per kilogram of body weight per day (usually 100 to 200 mg.) initially, we have encountered no significant toxic symptoms. Maintenance dosage is usually in the range of 25 to 100 mg. When relapse occurs, the disease has ordinarily become resistant to 6-mercaptopurine but may respond to a folic acid antagonist and/or steroids.

Acute myelocytic leukemia. All results of therapy in acute myelocytic leukemia are poor. Remissions are infrequent and ordinarily are of short duration. There is little choice between folic acid antagonists and 6-mercaptopurine. At best 25 to 30 per cent of patients experience a clinical remission with use of these drugs. Hormones were said to be of no value and in some cases seemed even to accelerate the progress of the disease.¹⁴

Hayhoe and Whitby prefer 6-mercaptopurine to folic acid antagonists in the leukemic form of acute myelocytic leukemia. Because of the inability to use peripheral blood counts in controlling treatment in subleukemic or aleukemic varieties, they prefer cortisone in the latter types.

Both Hall and Burchenal¹⁷ believe that 6-mercaptopurine is the drug of choice in acute myelocytic leukemia.

While most investigators have found Myleran ineffective in the treatment of acute myelocytic leukemia, Bierman¹⁷ reports improvement in 50 per cent of his patients treated with this drug. In his practice, 6-mercaptopurine and folic acid antagonists are less effective. About 10 per cent of his patients with the disease who received steroids exhibited exacerbations.

We prefer to use 6-mercaptopurine with or without steroids in the treatment of this form of leukemia. Dosage is similar to that of acute lymphocytic leukemia. We do not feel that steroids accelerate the disease. Progress of the disease is rarely affected by any form of therapy.

Acute monocytic leukemia. Remissions with any type of treatment in acute monocytic leukemia are so few that there is no single treatment of choice. Occasionally, transient remissions may occur with either folic acid antagonists or 6-mercaptopurine. Because of its lower tox-

icity, 6-mercaptopurine is perhaps the preferable therapeutic agent. Steroids are not believed to be of value and are perhaps even contraindicated because of a possible accelerating effect on the disease.¹⁴ We do not hesitate to use them in severely ill patients to reduce fever or to control hemorrhagic symptoms. In many instances, transfusions and symptomatic treatment constitute the wisest management.

Among the agents contraindicated or of no value in acute leukemia are x-ray (except when applied locally), P³², TEM, nitrogen mustards, Colcemide, Fowler's solution, Urethane, Tapa and Thio-tapa, and probably Myleran.

SUMMARY

The management of leukemia today involves the use of multiple agents used singly or in combina-

tion. In chronic leukemia, external irradiation remains the treatment of choice. Radioactive phosphorus and chemotherapeutic agents, such as TEM and Myleran, constitute valuable alternative methods of treatment.

In acute leukemia, steroids and antimetabolites in varying sequences or combinations provide the most effective therapy. Blood transfusions are important ancillary measures in all forms of leukemia.

Although results of treatment leave much to be desired, particularly in acute leukemia, there is reason to believe that more effective agents will soon evolve from the intensive investigation now in progress.

This investigation was supported in part by a research grant No. C-2474 from the National Institutes of Health Public Health Service.

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DETERMINATION of the serum iron level aids in the differential diagnosis of jaundice. Chauncey M. Stone, Jr., M.D., John M. Rumball, M.D., and Claire P. Hassett, Veterans Administration Hospital, Coral Gables, Florida, believe that less specific tests should be replaced by this method.

Elevated serum iron levels are produced by hemosiderosis; diseases associated with hemolysis, such as acute hemolytic anemia with or without jaundice; hemochromatosis; and pernicious anemia. Acute hepatitis is the only acute infectious disease known to cause elevation of the serum iron level. With acute hepatitis, levels reach a peak twelve to thirty-one days after onset of jaundice. The greatest rise in serum iron probably is not related to the severity of the disease. However, late appearance of the peak level may be due to a more severe type of hepatitis. Serum iron levels are not elevated with cirrhosis of the liver or obstructive jaundice.

If made early in the course of the disease, serum iron determinations are useful in distinguishing acute hepatitis from obstructive jaundice. The test is more specific than the thymol turbidity test and is not difficult to perform.

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Acetyl-Digitoxin

A Clinical Study

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THE ADVANTAGES of the pure cardiac glycosides over whole leaf digitalis have been well established.^{1,2} The assurance of uniform potency by chemical weight standardization and the ease of rapid oral digitalization with a relatively small number of tablets as well as greater ease of control of digitalization are a great boon to the treating physician. Although central nausea occurs with excessive dosage of the glycosides as it does with digitalis leaf, usually nausea or vomiting due to local gastric irritation is not caused by the glycosides. However, emesis due to local irritation is a frequent occurrence with the whole leaf preparations both because of the large number of tablets that must be administered in order to digitalize the patient in twenty-four hours and also because of extraneous matter incorporated in the crude drug and, therefore, in the tablets. Are these advantages of great enough significance to totally abandon the use of digitalis leaf for routine digitalization of the average patient in congestive heart failure? An analysis of the disadvantages of the glycosides in popular use today scarcely warrants doing so.

The frequently used glycoside, digitoxin, has the property of being almost completely absorbed from the gastrointestinal tract.¹ Its great drawback, however, is its tendency to prolong toxic manifestations because of its slow rate of excretion. Flaxman³ reported over 30 cases of digitoxin poisoning occurring over a period of thirteen months. These were largely serious cardiac arrhythmias; the majority of the patients did not have other symptoms of digitalis poisoning. Development of cardiac toxicity before

the development of other manifestations of overdosage is a serious disadvantage. Digitoxin is very slowly eliminated and toxicity from this glycoside may be present, therefore, for a long time.⁴ So, although this glycoside has many advantages, for example, prolonged activity and ease of administration, it is certainly not ideal.

Digoxin was thought to be more desirable than digitoxin because of its rapid elimination. However, it is so irregularly absorbed from the gastrointestinal tract that digitalization is often difficult to achieve and, at times, even more difficult to maintain unless the patient is seen at frequent intervals.⁵ In our own hands, this glycoside has been difficult to use chiefly because the maintenance dose varies so frequently even in the same patient because of poor absorption. Therefore, this glycoside also fails to be ideal.

Recently, Bernstein⁶ and his group analyzed acetyl-digoxin which was supposed to be more consistently absorbed from the alimentary tract than Digoxin and yet possess all of the advantages of the latter glycoside. Clinical trial, however, demonstrated that it had no particular advantage over the glycosides in use, so it seemed to have no place in our armamentarium.

Lanatoside C was also considered at one time to be a desirable glycoside, because it is rapidly excreted so that, if toxicity develops, it is rapidly dissipated.^{7,8} However, only a small percentage is absorbed from the gastrointestinal tract, making digitalization extremely difficult to maintain.⁷ Another objection is the high initial dosage required for oral digitalization. Orally, therefore, this agent has most of the disadvantages of Digoxin, and it too falls short of being an ideal glycoside.

Gitalin has received glowing reports in the literature in the past several years.⁹⁻¹¹ Although investigators in the 1930's were not very enthusiastic, the introduction of the amorphous form is said to produce a therapeutic ratio one-third greater than the aforementioned glycosides or whole leaf. This increased therapeutic ratio was felt to be of pronounced advantage. However,

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"therapeutic ratio" is only one facet of the problem, and this preparation also causes such varied reactions in the same patient as well as in other patients that its worth is questionable. Furthermore, its absorption is irregular in many patients, and we find it fails to demonstrate superiority over Digoxin but has all of its disadvantages.

Therefore, a drug that is as completely absorbed as digitoxin combined with a more rapidly excreted drug would be an answer at least in part to the glycoside problem, and, if not an answer, it does help to cut this "Gordian knot."

Stoll and Kreis¹² prepared some years ago from *Digitalis lanata* a new glycoside, acetyl-digitoxin- α , which is derived from lanatoside A by enzymatic removal of one molecule of glucose. When tested in animals, this preparation appeared to fulfill the desirable criteria mentioned above of excellent absorption and rapid excretion.

The most complete article on the subject to appear in the American literature to date is that by Loeffler and associates,¹³ who also described the clinical use of this drug in 1953.¹⁴ They concluded that the drug is a valuable addition to our cardiac armamentarium, since its effect is more quickly reversible than that of digitoxin, and its absorption is almost as complete and as regular. Because of the chemistry, pharmacology, and clinical work available, this glycoside appeared desirable to evaluate.

The present study was undertaken to further observe the clinical use of this drug in the treatment of congestive heart failure and to compile more information on dosage.

METHODS AND MATERIALS

The drug used was acetyl-digitoxin (Acylanid). Each tablet contains 0.1 mg. or 0.2 mg. of this glycoside. Twelve patients in acute cardiac failure were treated at Martland Medical Center, Newark, New Jersey. Ages ranged from 43 to 80; average age was 53.8 years. Of this group, 75 per cent were between 50 and 70 years of age. There were 6 males and 6 females; 7 were Caucasians and 5 were Negroes. The etiologic type of heart disease varied as follows: arteriosclerotic heart disease, 5; hypertensive and arteriosclerotic cardiovascular disease, 4; cor pulmonale, 1; rheumatic heart disease uncomplicated, 1; and rheumatic heart disease plus hypertensive and arteriosclerotic heart disease, 1. None of these patients had received digitalis within four weeks prior to admission; most of them, in fact, had never received digitalis. We stress the fact that the majority of patients were digitalized for the first time, since most patients are more re-

sponsive to redigitalization and may not need as large a dose to respond adequately.⁴

These cases were unselected except for the exclusion of patients with recent myocardial infarction, chronic glomerulonephritis, active pulmonary disease, or other active infection. The multiple-dose method, considered the one of choice for administering digitoxin, was used.⁴ None of the patients was given a mercurial before digitalization, and only 1 required mercurial diuretics during the study. No other medication of any kind—except as previously noted—was administered during the period of observation, since we wanted to be sure that any toxic symptoms could be attributed solely to the acetyl-digitoxin. The only adjuvants were a low-salt diet, bed rest, and oxygen.

After obtaining a control electrocardiogram and recording the venous pressure and weight of each patient, 0.4 mg. of acetyl-digitoxin was administered every six hours. A careful check was made for signs of digitalis effectiveness and for toxic symptoms before each successive dose. Electrocardiograms were repeated daily after every 1.6 mg. of the drug had been administered or when toxicity was suspected. Venous pressures were repeated after the patients were clinically digitalized. The dosage of 0.4 mg. every six hours was repeated until toxicity developed or the patients had received 6.4 mg. We thought it advisable to discontinue administration at 6.4 mg. because of the danger of a cumulative effect producing an irreversible arrhythmia. If no toxicity was apparent during the administration of this dosage, the drug was discontinued for three days. The patients were observed closely for relapse into failure, further effect of the drug, and particularly latent toxic effects. At the end of three days, another 6.4 mg. was given in the same divided doses. However, this time the drug was discontinued for only two days. After the two-day interval, a third trial of 6.4 mg. was administered in the same manner. If toxicity appeared at any time during these trials, the drug was discontinued until the toxic symptoms or electrocardiographic signs disappeared and then again administered until the three trials were completed.

Adequate digitalization in this study was considered present when loss of edema occurred; the liver returned to normal size and tenderness was absent; rales disappeared; venous pressure became normal (up to 9 cm. of water, method of Moritz and Tabora¹⁵); and in cases of auricular fibrillation, the ventricular rate decreased to 65 to 80 beats per minute at rest and under 100 beats per minute on effort.¹⁶

TABLE 1
RESULTS OF THE USE OF ACETYL DIGITOXIN IN THE TREATMENT OF CARDIAC FAILURE

<i>Case</i>	<i>Age</i>	<i>Sex</i>	<i>Etiology</i> [°]	<i>Anatomic findings</i> [°]	<i>Starting rate and rhythm</i>	<i>Digitalizing dose</i>
1, F. M.	57	M	ASHD	Enlarged heart, myocardial fibrosis, coronary sclerosis	140 A.F.	1.6 mg.
2, G. R.	60	M	HASHD	Enlarged heart, myocardial fibrosis, coronary sclerosis	88 R.S.R.	1.2 mg.
3, G. C.	71	F	ASHD	Enlarged heart, myocardial fibrosis, coronary sclerosis	120 A.F.	2.0 mg.
4, S. W.	64	M	HASHD	Enlarged heart, myocardial fibrosis, coronary sclerosis	92 R.S.R.	1.6 mg.
5, M. S.	76	F	ASHD	Enlarged heart, myocardial fibrosis, coronary sclerosis	44 A.F.	1.2 mg.
6, H. H.	56	M	Cor Pulmonale	Enlarged heart	84 R.S.R.	2.4 mg.
7, C. C.	66	M	ASHD	Enlarged heart, myocardial fibrosis, coronary sclerosis	120 A.F.	1.6 mg.
8, D. P.	43	F	HASCVD	Enlarged heart, myocardial fibrosis, coronary sclerosis	105 R.S.T.	2.0 mg.
9, E. O.	80	F	ASHD	Enlarged heart, myocardial fibrosis, coronary sclerosis	84 R.S.R.	0.8 mg.
10, P. F.	66	F	RHD	Enlarged heart, mitral stenosis, mitral insufficiency, aortic stenosis, aortic insufficiency	110 A.F.	2.0 mg.
11, W. L.	49	M	HASHD RHD	Enlarged heart, myocardial fibrosis, coronary sclerosis, mitral stenosis, mitral insufficiency	150 A.F.	
12, C. C.	75	F	HASHD	Enlarged heart, myocardial fibrosis, coronary sclerosis	75 R.S.R.	1.6 mg.

[°]According to the Nomenclature and Criteria for Diagnosis of Diseases of the Heart. New York Heart Association, ed. 7, 1939.

RESULTS

Table 1 is a tabulation of the results. Digitalization was adequate in 11 patients long before toxic symptoms appeared. The only person in whom the drug failed, case number 11, became toxic after receiving 3.6 mg. He was not digitalized at this time. Since his condition was still poor, mercurials were deemed advisable for the relief of his cardiac failure. The digitalis toxicity cleared in two days, and he was then given parenteral Cedilanid followed by digitalis leaf. This therapy was also ineffective. The patient's condition deteriorated rapidly; the intractable failure was further complicated by pulmonary emboli

which became apparent on the third day of hospitalization. However, these may have been present before therapy was instituted and may help to account for the failure of the digitalis preparations. He expired on the seventh hospital day. Unfortunately, we were unable to obtain permission for postmortem examination.

In the other 11 patients, the average digitalizing dose was 1.64 mg., ranging from 0.8 mg. to 2.4 mg. Of this group, 4 had rapid auricular fibrillation. A dose of 1.8 mg. was needed to digitalize this group. In patients with a regular sinus rhythm or regular sinus tachycardia, the drug showed no consistent effect on rate. In our

TABLE 1—(continued)

<i>Case</i>	<i>Rate when digitalized</i>	<i>Toxic dose</i>	<i>Manifestations</i>	<i>Dissipation of symptoms</i>
1, F. M.	80	6.4 mg.	No toxicity	2 days
		6.4 mg.	No toxicity	
		3.2 mg.	Anorexia, blurred vision	
2, G. R.	85	6.4 mg.	No toxicity	
		6.4 mg.	No toxicity	
		6.4 mg.	No toxicity	
3, G. C.	72	4.4 mg.	Nausea, vomiting, pain in masseter muscle	2 days
		4.0 mg.	Nausea, vomiting	2 days
		4.0 mg.	Nausea, vomiting, bigeminy**	2 days—1 day**
4, S. W.	86	4.8 mg.	Anorexia	2 days
		3.6 mg.	Anorexia, nausea, 1° heart block	2 days
		3.2 mg.	Anorexia, Wenckebach rhythm	2 days
5, M. S.	36	2.4 mg.	Vomiting	1 day
		2.4 mg.	Vomiting	1 day
		2.0 mg.	Vomiting	1 day
6, H. H.	84	5.2 mg.	Nausea, vomiting, ventricular PVC	1 day
		4.8 mg.	Nausea, vomiting	1 day
		4.8 mg.	Nausea, vomiting	1 day
7, C. C.	65	3.6 mg.	PVC, anorexia	1 day
		4.8 mg.	PVC, anorexia	1 day
		4.4 mg.	Anorexia	1 day
8, D. P.	105	4.4 mg.	Psychosis	2 days
		4.8 mg.	Psychosis	1 day
		4.4 mg.	Psychosis	1 day
9, E. O.	80	2.4 mg.	Nausea, vomiting, PVC	1 day
		2.0 mg.	Anorexia and PVC	1 day
		2.0 mg.	Anorexia	2 days
10, P. F.	75	5.6 mg.	Nausea, vomiting, bigeminy	1 day
		5.2 mg.	PVC, nausea, vomiting	2 days
		3.6 mg.	PVC, nausea, vomiting	2 days
11, W. L.		3.6 mg.	Nausea, vomiting, bigeminy	2 days
		4.4 mg.	Nausea	2 days
		4.8 mg.	Nausea	2 days
12, C. C.	80	4.0 mg.	Nausea	1 day

opinion, the patient's heart rate cannot be considered a good criterion of digitalization.

There were 2 patients who tolerated 6.4 mg. of acetyl-digitoxin without side effects. The smallest dose required to render any patient toxic was 2.4 mg. In computing the average toxic dose in this study, we believe that it is better to err on the conservative side and assume that the 2 patients who did not become toxic with 6.4 mg. would have done so after 6.8 mg. The average toxic dose for the group would then be 4.5 mg., and ratio of digitalizing dose to toxic dose by this method would be 37 per cent.

After the rest interval or interval required to dissipate the toxicity, 3 patients required larger

doses of acetyl-digitoxin to become toxic, 4 required less, and 2 became toxic on the same dose. After receiving 6.4 mg. a second time, 2 patients again showed no toxicity. The drug was then discontinued for two days. On the third trial, 7 patients became toxic on a smaller dose than on the second trial, and 4 tolerated the same dosage. Of the 4 patients, toxicity did not develop in 1 throughout the 3 trials (case number 1). The smallest dose to cause toxicity during any trial was 2 mg. (case 5, third trial). No evidence of failure between trials was noted.

Toxic manifestations were similar to those seen for other digitalis preparations; the earliest observed were anorexia, nausea, and vomiting.

Blurred vision occurred in 1 patient, psychosis in 1, and masseter muscle pain in 1. These toxic symptoms far outnumber the arrhythmias, and an arrhythmia was never seen before subjective manifestations became apparent. The most common irregularity was premature ventricular contractions. Bigeminal rhythm was observed 3 times, prolonged PR interval occurring 1 time as did the Wenckebach phenomenon. The latter 2 arrhythmias appeared in the same patient (case 5, trials 2 and 3).

The most significant finding in this part of the study is the fact that every toxic symptom was dissipated in one to two days after withdrawal of the drug, including second and third trials.

Congestive heart failure was graded according to severity: grade 1, mild; grade 2, moderate; grade 3, severe; and grade 4, very severe. Each patient was given 0.4 mg. of acetyl-digitoxin every six hours.

CASE REPORTS

Case 1. F. M., a 57-year-old white male, was admitted with arteriosclerotic heart disease and grade 3 congestive heart failure. The roentgenogram showed enlargement of the left ventricle. The rhythm was auricular fibrillation with a rate of 140 beats per minute. He was completely digitalized after 1.6 mg.; his ventricular rate being reduced to 80, which abolished a pulse deficit of 20. He was given 6.4 mg. without toxicity. The drug was discontinued for three days without recurrence of failure or loss of digitalis effect on the electrocardiogram. Then the same regime was repeated until another 6.4 mg. had been given. Again no toxic manifestations appeared. After stopping therapy for two days, acetyl-digitoxin was administered a third time. This time, after receiving 3.2 mg., he began to complain of anorexia and blurred vision. Two days after cessation of therapy, the toxic symptoms had cleared. He was then placed on a maintenance dose of acetyl-digitoxin.

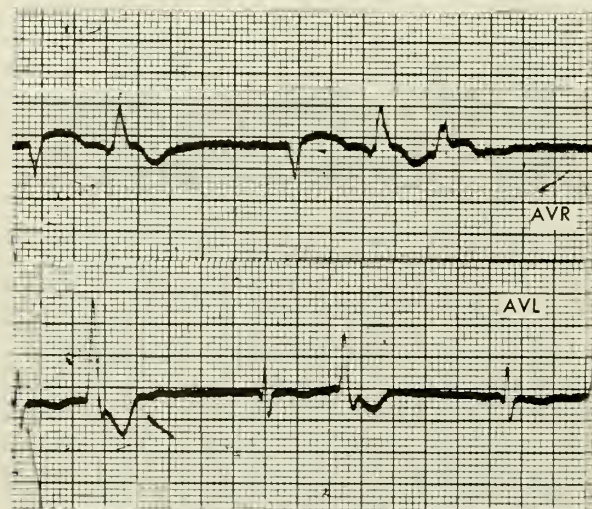


Fig. 1a. Leads AVR and AVL in case 3, October 11, 1954, showing ventricular bigeminy after the third administration of 4 mg. of acetyl-digitoxin.

Comment. This case was one of 2 in which the patient tolerated 6.4 mg. without toxic symptoms on at least 2 trials with only a three-day rest period between courses.

Case 2. G. R., a 60-year-old Negro male, was admitted with hypertensive and arteriosclerotic heart disease, cardiac enlargement, and grade 3 congestive heart failure. He had been in failure for one year and had taken digitalis leaf sporadically without doctor's supervision. However, he had not taken digitalis for nine months prior to admission and was in severe failure. The patient had a regular sinus rhythm of 88 beats per minute. After receiving 1.2 mg., he was considered adequately digitalized. His venous pressure, which had been 190 mm. of water before therapy, dropped to 84 mm. of water. His ventricular rate was the same as before therapy. He was given 6.4 mg. of acetyl-digitoxin with no evidence of toxicity, and the drug was then discontinued for three days. Another 6.4 mg. was then administered with no signs of toxicity. After two days without treatment a third trial of 6.4 mg. was given and no toxic signs or symptoms occurred. His cardiac silhouette at this time was normal size, and he was discharged on maintenance digitalis therapy.

Comment. This is the only patient in whom 3 trials failed to elicit toxic symptoms with effective digitalization after administration of 1.2 mg. of acetyl-digitoxin.

Case 3. G. C., a 71-year-old white female, was admitted with arteriosclerotic heart disease, enlarged heart, and grade 2 congestive heart failure. The electrocardiogram revealed auricular fibrillation with a ventricular rate of 120 beats per minute and pulse rate of 100. After receiving 2.0 mg. of acetyl-digitoxin, her ventricular rate was 72, the pulse deficit was erased, and she was well digitalized. The first signs of toxicity were noted after she had taken 4.4 mg.; these consisted of nausea and vomiting and pain in the left masseter muscle. The drug was discontinued, and in two days the symptoms had abated. On the second trial, nausea and vomiting again ensued after she was given 4 mg. and did not disappear for two days. After again receiving 4.0 mg., the same symptoms recurred. This time coupling

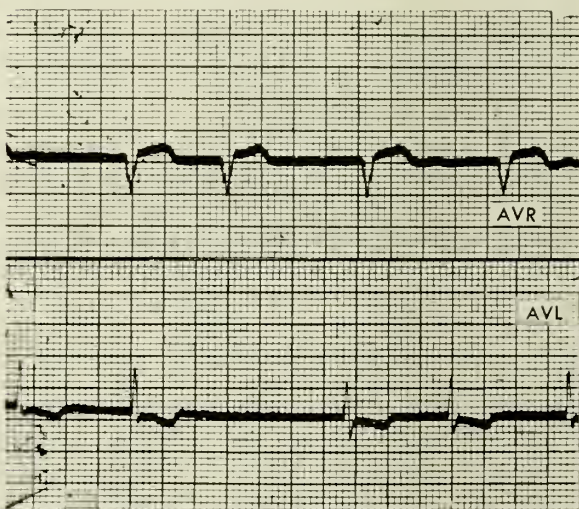


Fig. 1b. Leads AVR and AVL in case 3, October 12, 1954, one day after discontinuance of therapy. Note reversion to auricular fibrillation (coupling no longer present).

was noted on the electrocardiogram with a ventricular rate of 76 beats per minute (figure 1a). She was still vomiting twenty-four hours later, but the electrocardiogram had returned to its original form (figure 1b). The noncardiac symptoms subsided one day later.

Comment. This case demonstrates the appearance of nausea and vomiting before evidence of cardiac toxicity and the rapid disappearance of the cardiotoxic effects.

Case 4. S. W., a 64-year-old Negro male, was admitted with hypertensive arteriosclerotic heart disease, enlarged heart and anasarca, and grade 3 congestive heart failure. He had never received digitalis prior to admission. The patient had a regular sinus rhythm of 92 and required 1.6 mg. of acetyl-digitoxin for digitalization. His rate after digitalization showed no changes. He lost 12 lb. in twenty-four hours without the aid of mercurials. After receiving 4.8 mg. of the drug, he began to complain of anorexia and the drug was discontinued. His appetite did not return to normal for two days. After administration of 3.6 mg. during the second trial, anorexia returned accompanied by nausea. That day an electrocardiogram revealed a P-R interval of 0.24 seconds (figure 2a). The P-R interval returned to normal in forty-eight hours (figure 2b). On the third trial, he complained of loss of appetite after receiving 3.2 mg. An electrocardiogram taken at this time showed the Wenckebach phenomenon (figure 2c). The drug was discontinued. An electrocardiogram taken twenty-four hours later revealed a return to its original form (figure 2d). On that day, improvement in appetite was also evidenced.

Comment. Here again noncardiac symptoms appeared without cardiac toxicity until the third trial.

Case 5. M. S., a 76-year-old white female, entered the hospital with arteriosclerotic heart disease, complete heart block, and auricular fibrillation with a rate of 44. She had an enlarged heart and was in grade 2 congestive heart failure. There was no history of digitalis medication. She was digitalized in the usual manner with acetyl-digitoxin but observed with great care because of the slow ventricular rate. However, the signs of failure cleared after administration of 1.6 mg., and she did not become toxic until she had received 2.4 mg. Her rate slowed to 36 beats per minute when she became fully digitalized. Emesis was the toxic manifestation, which stopped after one day. Another 2.4 mg. was given before the drug had to be discontinued because emesis recurred. This toxicity was dissipated in one day. On the third trial, vomiting commenced after she received 2 mg. and ceased in one day.

Comment. Another case in which myocardial toxic effects did not appear in 3 trials, although nausea and vomiting occurred.

Case 6. H. H., a 56-year-old white male, was admitted with cor pulmonale due to pulmonary fibrosis and emphysema. He was in grade 1 right-sided heart failure. This was his first attack of decompensation, and he had never received digitalis. A regular sinus rhythm of 84 beats per minute was noted electrocardiographically. He required 2.4 mg. of acetyl-digitoxin to become digitalized. His ventricular rate remained unchanged. He exhibited no signs of toxicity until he had received 5.2 mg. of the drug, whereupon nausea and vomiting ensued. Until this time, electrocardiographs showed no evidence of toxicity, but the day that the subjective manifesta-

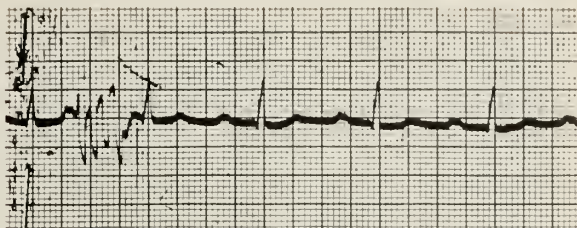


Fig. 2a. Lead I in case 4, February 22, 1955. First degree heart block. P-R interval 0.24 after administration of 3.6 mg. of acetyl-digitoxin on the second trial.

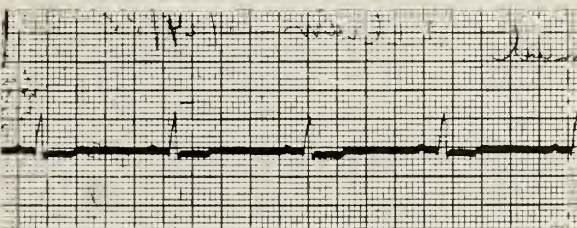


Fig. 2b. Lead I in case 4, February 24, 1955. P-R interval .16 two days after therapy was discontinued.

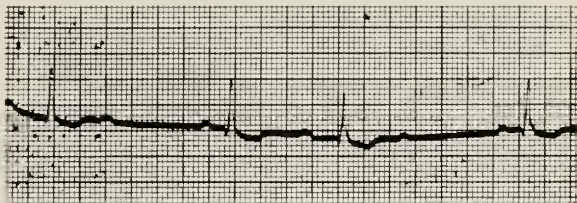


Fig. 2c. Lead AVL in case 4, February 26, 1955. Wenckebach rhythm after administration of 3.2 mg. of acetyl-digitoxin on the third trial.

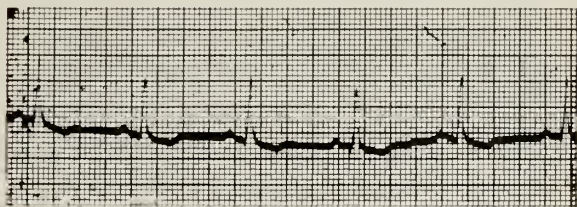


Fig. 2d. Lead AVL in case 4, February 27, 1955. Normal AV conduction. P-R interval .16 one day after cessation of therapy.

tions appeared, ventricular premature contractions were noted. After one day without medication, the premature ventricular contractions disappeared. The nausea and vomiting also subsided. On the second trial, 4.8 mg. was administered before the subjective symptoms became apparent. No changes were noted on the electrocardiogram. On the third trial, 4.8 mg. caused nausea and vomiting. Again, these symptoms disappeared after only one day. No electrocardiographic changes were observed on the third trial.

Comment. Again the safety factor is demonstrated by rapid disappearance of toxic signs.

Case 7. C. C., a 66-year-old white male, was sent into the hospital with arteriosclerotic heart disease, enlarged heart, grade 2 congestive heart failure, and auricular fibrillation with a rate of 120 beats per minute. He had suffered a myocardial infarction four years prior to admission, at which time the auricular fibrillation had developed and had persisted. This was his first episode of heart failure and 1.6 mg. of acetyl-digitoxin was re-

quired to digitalize him. His rate after digitalization was 65 beats per minute. No toxic effects were noted until after 3.6 mg. was administered, at which time anorexia was present. An electrocardiogram at that time showed one premature ventricular contraction. Medication was discontinued and the next day his appetite was normal and the premature ventricular contraction had disappeared. On the second trial, 4.8 mg. of the drug was administered before signs of toxicity appeared, a premature ventricular contraction appearing at the same time anorexia developed. Again, symptoms and evidence of myocardial toxicity were dissipated after one day. On the third trial, 4.4 mg. was tolerated before anorexia became apparent. No premature ventricular contractions or other electrocardiographic signs of toxicity appeared on this trial. The appetite aberrations disappeared in one day.

Comment. Ease of digitalization and ease of control of toxicity are well demonstrated in this patient.

Case 8. D. P., a 43-year-old Negress, was admitted with known hypertensive and arteriosclerotic heart disease of five years' duration. Her blood pressure was 220/110, her heart was markedly enlarged, and she had grade 3 Keith-Wagner eyeground changes. This was her first episode of congestive heart failure and it was of grade 2 severity. She had a sinus tachycardia with a rate of 105 beats per minute. Administration of 2 mg. of acetyl-digitoxin was necessary before she could be considered adequately digitalized. Her rate remained at 105. After receiving 4.4 mg., the patient suddenly became disoriented concerning time and place. This manifestation of psychosis was the only toxic symptom noted during the 3 trials, but it appeared each time. The first time this disturbance did not clear for two days. It disappeared the second and third times after one day. On the second trial, the same disorientation occurred after she was given 4.8 mg. but was not as pronounced. The third time memory impairment was observed after 4.4 mg. was administered.

Comment. This patient had a completely negative past history as far as encephalopathic episodes were concerned, and since no acute rise in blood pressure occurred to account for these episodes, digitalis intoxication was considered the most reasonable explanation for these episodes. No electrocardiographic changes were noted in any of the trials.

Case 9. E. O., an 80-year-old white female, was admitted with diagnosis of arteriosclerotic heart disease and grade 1 congestive heart failure. She had never been digitalized, although she had complained of paroxysmal nocturnal dyspnea for three months. She was in minimum left ventricular failure, and only 0.8 mg. of acetyl-digitoxin was required before she became digitalized. After receiving 2.4 mg., nausea and vomiting necessitated discontinuance of the medication. An electrocardiogram taken that day showed a premature ventricular contraction. After one day without medication, symptoms and signs disappeared. On the second trial, 2 mg. of the drug was sufficient to induce anorexia, and again a premature ventricular contraction was noted. On the third trial, anorexia was evident after 2.0 mg. without toxic manifestations on the electrocardiogram. After two days, her appetite returned to normal, and she was placed on maintenance digitalis therapy.

Comment. This case again demonstrates the care that must be exercised when giving any digitalis preparation to elderly people. It also shows again the ease with which toxic signs disappear, even in the aged, upon administration of this drug.

Case 10. P. F., a 66-year-old colored female, was admitted with rheumatic heart disease, mitral stenosis, mitral insufficiency, aortic stenosis, aortic insufficiency, and an enlarged heart. She gave no history of rheumatic fever, but remembered having had frequent sore throats in her youth. Like most of the others in our series, this was her first episode of congestive heart failure. She had auricular fibrillation with a ventricular rate of 110 and was in grade 2 heart failure. She required 2.0 mg. of acetyl-digitoxin before digitalization took place. When she was compensated, her rate was reduced to 75. Administration of 5.2 mg. of the drug did not cause symptoms or electrocardiographic manifestations of toxicity, but after receiving 5.6 mg., nausea and vomiting developed, and an electrocardiogram taken at that time showed ventricular coupled beats. Only one day was required for the toxic symptoms and electrocardiographic changes to disappear. On the second trial, the same toxic symptoms appeared after she was given 5.2 mg. That day multifocal premature contractions were noted on the electrocardiogram. The electrocardiogram did not return to its original form and the symptoms did not abate for two days. On the third trial, 3.6 mg. caused nausea and vomiting and multifocal premature ventricular contractions. Symptoms and evidence of myocardial toxicity were not dissipated for two days.

Comment. In this patient, cardiac and extra-cardiac symptoms of toxicity paralleled one another.

Case 11. W. L., a 49-year-old white male, was admitted with a history of rheumatic heart disease of twenty years' duration and hypertensive arteriosclerotic heart disease of eight years' duration. He had suffered a myocardial infarction five years prior to this admission, accompanied by auricular fibrillation and congestive heart failure. He was maintained on digitalis leaf until he was discharged from the former hospital but had not taken digitalis for the five years preceding the present admission. On admission, he had auricular fibrillation with a rate of 150 beats per minute and was in grade 4 heart failure. The electrocardiogram showed evidence of an old myocardial infarction. The heart was enlarged radiographically in all of its chambers. In this case, toxicity appeared before improvement could be ascertained on our therapy. Nausea and vomiting commenced after he was given 3.6 mg. of acetyl-digitoxin. His cough, which was productive of copious amounts of sputum from the time of admission, became blood tinged. A roentgenogram showed a circumscribed shadow in the right-lower lobe, which was interpreted as a probable pulmonary infarction. The electrocardiogram was confirmatory. A high R wave appeared in lead 6, and the axis changed from left to right. Because of his poor condition, mercurials were deemed advisable. He received Mercurhydrin intramuscularly for two days without remarkable effect. The digitalis toxicity cleared during the two-day period of mercurial therapy. He was given a digitalizing dose of Cedilanid intravenously and then medication was changed to digitalis leaf, but his cardiac failure could not be controlled. His condition deteriorated rapidly and he expired on the

seventh hospital day. Permission for autopsy was not granted.

Comment. This was the only patient in whom digitalization with acetyl-digitoxin by our method was unsuccessful. His intractable failure was due to longstanding heart disease in addition to pulmonary infarction.

Case 12. C.C., a 75-year-old Negress, was admitted with hypertensive arteriosclerotic heart disease, enlarged heart in grade 2 congestive failure. She had a regular sinus rhythm of 75 beats per minute. Digitalization occurred after 1.6 mg. of acetyl-digitoxin was administered. When digitalized, her ventricular rate was 88 beats per minute. On the first trial, 4.4 mg. of the drug caused nausea which disappeared in two days. On the second trial, after receiving 4.8 mg., nausea again appeared but diminished in two days. On the third trial, 4 mg. produced toxicity which ended one day after cessation of therapy.

Comment. No toxic changes were noted on the electrocardiogram. This is another patient with an initial regular sinus rhythm in whom the ventricular rate was not slowed by digitalization and in whom only extracardiac signs of toxicity were noted.

DISCUSSION

The results of this study demonstrate that acetyl-digitoxin is an effective preparation for initial digitalization and redigitalization of the patient in cardiac decompensation. Usually digitalization is easily accomplished with divided oral doses in twenty-four to forty-eight hours.

De Graff and associates⁴ digitalized 37 patients with digitoxin using the multiple-dose method of digitalization. The average therapeutic dose in their series was 2.2 mg. The average toxic dose in the same patients was 4.1 mg. These investigators also studied digitoxin by the single-dose method advocated by Gold and associates.¹⁷ Only 17 per cent became digitalized after a single dose of 1.2 mg. Moreover, when the frequently recommended dose of 1.2 mg. of digitoxin was given in a single dose, numerous toxic manifestations occurred in patients who required less than is recommended.³

If we compare the results of the study by De Graff and associates⁴ with our own series, several features seem to indicate that acetyl-digitoxin is the more desirable glycoside. First, the average digitalizing dose of acetyl-digitoxin in our series is 1.64 mg. compared to 2.2 mg. of digitoxin in the De Graff series. Second, the average toxic dose in our series is 4.5 mg. and that of De Graff is 4.1 mg. The most important difference, however, is the fact that the toxic symptoms of digitoxin persisted for many days, whereas in our series the symptoms were dissipated in twenty-four to forty-eight hours. Although the digitalizing dose varies as does the

toxic dose, the rapid rate of dissipation certainly gives acetyl-digitoxin a pronounced advantage therapeutically over digitoxin. A direct comparison between acetyl-digitoxin and digitoxin was made by Zilli and Luisada¹⁸ in 13 cases, and they too found that the rapid excretion of acetyl-digitoxin made this glycoside more desirable for general use than digitoxin.¹⁸ Its rapid dissipation was also stressed by Maher and Pullen.¹⁹

Loeffler and associates¹³ found that the intravenous digitalizing dose of acetyl-digitoxin was 1.2 mg. Our oral digitalizing dose was 1.64 mg. This indicates excellent absorption from the gastrointestinal tract. Therefore, for all practical purposes, the absorptive property of this drug is as complete as that of digitoxin and more complete and regular than that of Digoxin, lanatoside C, and gitalin.

Acetyl-digitoxin is excreted much more rapidly than digitoxin. This statement is based on our own observations of the rapid reversibility of toxic effects of acetyl-digitoxin. Loeffler and associates¹³ observed that the rate of excretion of acetyl-digitoxin was twice that of digitoxin or 14 per cent compared to 7 per cent. Our results tend to confirm these findings, although we realize that no two studies by different investigators are strictly comparable, since the degree of myocardial injury may vary from series to series. Also, the investigators' criteria for adequate digitalization may differ. This statement also applies to our results with acetyl-digitoxin compared to that of De Graff with digitoxin. As Hejtmancik and Herrmann⁹ stated, "The only truly comparable data for digitalis preparations would be that obtained on an identical series by the same observer, preferably with the same patient in each series." However, we feel that for all practical purposes the comparisons are valid.

Rapidity of excretion can also be ascertained by considering the duration of digitalis effects when acetyl-digitoxin was discontinued. Since digitalization was maintained in all patients during the rest interval between trials, we can conclude that acetyl-digitoxin is not excreted as rapidly as lanatoside C. This is a pronounced advantage, since patients may forget to take a dose of the glycoside for a day or two, and, with acetyl-digitoxin, digitalization is not lost.

Another desirable attribute of acetyl-digitoxin is that nausea and vomiting usually precede the toxic effects on the myocardium. This may not always be the sequence, but certainly it does occur far more often than with digitoxin. It is always advantageous to have the noncardiac toxic effects become manifest first so that the

drug can be discontinued before serious arrhythmias develop.

The physician selecting a digitalis preparation for initial digitalization of the patient in congestive heart failure is concerned primarily with the margin of safety of his drug. In the present study, the ratio of digitalizing dose to toxic dose was 37 per cent, which suggests that a wide margin of safety exists in the pharmacologic action of acetyl-digitoxin. Exemplifying this finding are the patients in our series who tolerated many times the average digitalizing dose without toxic signs even on repeated dosage.

Based on the above factors, we believe this glycoside has definite advantages over many of the other glycosides and is a valuable addition in the treatment of cardiac failure.

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SUMMARY

1. Acetyl-digitoxin, a pure crystalline glycoside derived from *Digitalis lanata* was used in the treatment of 12 patients with congestive heart failure of varying causes and severity.

2. Acetyl-digitoxin was effectively and safely used in initial digitalization and redigitalization of 11 of 12 patients with heart failure.

3. A wide difference was observed between the therapeutic and toxic doses of acetyl-digitoxin.

4. On the basis of the wide safety range and rapid dissipation rate, we believe acetyl-digitoxin should replace digitoxin in the treatment of congestive heart failure.

Acetyl-digitoxin supplied as Acylanid by Sandoz Pharmaceuticals, Hanover, New Jersey.

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IF A PATIENT with a controlled primary cancer has a discrete pulmonary lesion, Charles R. Kelly, M.D., and Hiram T. Langston, M.D., Hines Veterans Administration Hospital, Hines, Illinois, believe that thoracotomy should be performed. Excision of a metastatic growth is often possible, and, in some patients, a second primary tumor may be discovered.

The patient should be carefully examined to detect extrapulmonary metastases; these are rarely amenable to surgical intervention. Pulmonary resection is not attempted when the recurrent laryngeal or phrenic nerve is involved, pleural effusion has occurred, or the tumor has extended into the chest wall. Prognosis is best if the lesion is confined to 1 lobe or segment. Localized, accessible, resectable metastases are somewhat more common with sarcoma than with carcinoma.

A significant number of pulmonary lesions in patients who have had malignant disease are actually second primary tumors rather than metastatic growths. Such tumors are likely to spread rapidly, in contrast to metastatic growths, which may remain localized for long periods. Since the only reliable means of differentiating metastatic and primary growths is histologic study, resection should be done early.

CHARLES R. KELLY, and HIRAM T. LANGSTON: *J. Thoracic Surg.* 31:298-315, 1956.

Emergency Care of the Patient with an Acutely Injured Head

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THE PERIOD of the first twenty-four hours is of vital importance in the management of the patient with an acutely injured head, for this is the time of greatest mortality. After this period, most of the problems first encountered become progressively less important.

Severe shock and active bleeding, which are detrimental to life, must have immediate attention. Ordinary repair of the scalp, skull, and brain should be delayed until shock and bleeding have been controlled and the patient's condition has become stabilized.

A head injury may be as light as a slap from the hand of a child or as severe as a crushing blow from a heavy object or the penetration of skull and brain by a flying missile.

Emergency care calls for a careful evaluation of the problems and an early institution of the therapy indicated. Proper handling of a patient immediately after he is injured is of primary importance. If the physician is at the scene of the accident, he can apply dressings to open wounds, pressure dressings to bleeding wounds, and, if necessary, ligate vessels to control active bleeding. He can determine the need for morphine or other opiates. Such depressants should be avoided unless the patient is in extreme pain, as these agents tend to increase the hazard. He can direct the attendants to hold the angle of the jaw forward to allow the patient to breathe and to move him gently and carefully so that he may receive maximum beneficial results from later treatment.

If the patient is handled improperly, his condition may be aggravated and the definitive treatment prejudiced so that additional delay in instituting treatment will be necessary—a delay that in the end may prove fatal. Too often a siren sings loudly, and the patient is rushed and bumped on the trip from the point of injury to the hospital only to arrive in a condition worse than that in which he was found. All too

often, under pressure from the family, he is taken to the operation room for surgery which could be accomplished with much greater safety after his condition had become stabilized.

The severely injured patient is often in shock; movement, especially rough movement, materially adds to that shock. With the usual equipment available in modern ambulances to keep patients warm and comfortable and to keep broken extremities immobilized, *speed* of movement is *not* important. Turning a patient roughly or shaking his head often materially adds to his shock—a fact often overlooked even in the operation room. If a patient is in mild shock, severe shock may result from simply turning and twisting his head during the application of the head dressing after a craniotomy. Excessive loss of spinal fluid as well as loss of blood adds materially to shock.

Asphyxia should be treated immediately. Permitting a partial or complete asphyxia to persist for more than a few minutes may prejudice brain function. It has been demonstrated repeatedly that total anoxia of the brain for five minutes or more may produce extensive permanent brain damage. This is an irreversible effect; even though some clinical improvement occurs, extensive brain damage is invariably present after prolonged severe asphyxia.

No patient can survive a *totally obstructed airway*. Frequently the trachea is obstructed by blood or aspirated vomitus. Turning the patient on his face and inserting a finger in the throat or inserting a mechanical airway may relieve the obstruction and reopen the airway. If these measures fail, aspiration should be instituted at once. Aspiration should not be limited to the back of the throat but should include the trachea and, if necessary, the bronchi. A large urinary catheter with a power suction serves to open the airway except in extreme situations, but a laryngoscope or bronchoscope may be necessary if the obstruction is firmly wedged in the trachea or bronchus. Aspiration should be carried

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Presented January 18, 1956, at the annual General Practice Review, University of Colorado School of Medicine.

out intermittently, allowing the patient to take deep breaths often, for continuous suction produces such severe anoxia that he may succumb.

The use of CO₂ inhalation to stimulate respirations in the presence of head injury with increased intracranial pressure and respiratory embarrassment is so dangerous that it accounts for many deaths. Its inhalation produces a severe intracranial venous congestion and increases intracranial pressure.

Tracheotomy should be used judiciously. Much has been written lately advising the immediate use of tracheotomy in the unconscious patient as a means of keeping the airway open. But only a few patients need be seen in whom the tracheotomy tube has become lodged crosswise or has from lack of attention become obstructed in another way in the trachea to understand the folly of considering tracheotomy as a routine procedure. If the oral passages cannot be opened quickly, tracheotomy should certainly be performed. The patient with a tracheotomy needs constant nursing care with the strictest sort of supervision by the physician to make sure the airway is kept open. As the obstructed airway is being alleviated and the oxygen exchange is becoming adequate, oxygen should be given routinely. This is particularly important in the higher mountain altitudes.

Hemorrhage may occur in any part of the body in coexistence with head injury. A compression dressing can be applied for temporary control of hemorrhage on the surface of the body, but identification of internal hemorrhage in the head, chest, or abdomen may be difficult, particularly if the patient is unconscious.

External hemorrhage from the scalp or the surface of the body can usually be controlled by a compression dressing during the period of transportation. Unless the blood supply to the structures distal to the compression is impaired, repair of the bleeding laceration or contusion is seldom urgent. The patient with external bleeding and head injury should be allowed a period of bed rest until the vital signs—breathing, pulse, and blood pressure—have become stabilized. This stabilization may take as long as twenty-four hours. By the end of twenty-four hours, the stomach has emptied and danger of aspiration pneumonitis is diminished. When stabilization is accomplished, the additional surgical trauma, occurring when repair is undertaken, has little effect on the patient's general course.

Prior to the use of antibiotics, immediate surgical repair of the lacerated scalp was the rule. This urgency no longer exists. On several occasions, I have delayed over night the surgical re-

pair in patients with compound skull and brain wounds. To date, no infections have developed in my patients; in every case, the course during surgery and the postoperative period has been without the usual hazards and uncertainties. Anesthesia has become easier to administer and less hazardous for the patient, and his recovery is more rapid. After the period of stabilization, the patient should preferably be given an oxygen saturated inhalation anesthesia. This method does not preclude the use of an intravenous anesthesia for induction. Debridement of the wounds should follow the usual methods. Severely contused, damaged, and dirty tissue should be excised and discarded, and the dura and scalp should be closed without drainage. If arterial bleeding is encountered, cauterization or ligation of the vessel controls it. If a dural sinus is lacerated, however, repair may be necessary simply with a suture or extensively with muscle or fascia. Since hemorrhage may occur at the time of surgery, blood should always be available in advance.

Internal hemorrhage whether in the head, chest, or abdomen is a difficult problem, requiring the utmost caution and urgency in treatment.

Subdural hematoma is usually slow in developing and does not, as a rule, need to be considered in the early twenty-four-hour period. However, if the hemorrhage is massive and acute, it should be handled in a manner similar to middle meningeal hemorrhage.

When the diagnosis of *middle meningeal hemorrhage* has been made, everything possible should be done to open the skull and drain and control the hemorrhage without delay. A delay of five minutes in instituting treatment is often the difference between life and death. The point at which the middle meningeal artery usually tears is internal to the skull outside the dura in the epidural space. The artery leaves the foramen spinosum in the skull to enter the dura in the middle fossa of the skull. It leaves a fixed structure, the skull, to enter a moveable structure, the dura. Therefore, an impact to the head occasionally causes the dural part of the artery to move enough to tear the artery in two. On other occasions, a skull fracture immediately over the bony channel of the middle meningeal artery may lacerate the artery as it runs in the dura.

Clinical evidence of this hemorrhage is not usually apparent until the brain is severely compressed. The blood under arterial pressure dissects the dura away from the skull. Since the intracranial pressure is not sufficient to retard the extension of the hemorrhage, progressive brain

compression results. Clinical symptoms and signs that follow this classic pattern are head injury, stupor, lucidity, developing stupor, coma, hemiplegia, and death. These changes may occur with such rapidity that no amount of speed can save the patient. The 50 per cent mortality rate — the best rate shown by statistics across the country — is evidence of the severity of the problem.

Internal injury and fractured bones are often concomitant to head injuries. *Hemothorax* may occur in connection with a head injury as a result of laceration of an intercostal artery. This bleeding may be slow or rapid, depending on the extent of the arterial tear. The signs and symptoms indicating bleeding into the pleural cavity may be identified more easily if the patient is conscious, for he can identify and report a feeling of oppression in the chest, air hunger, and shortness of breath. The signs of shock, cyanosis, and shortness of breath can be identified whether the patient is conscious or not. If the patient is unconscious and cyanosis and Cheyne-Stokes respiration have developed from increased intracranial pressure, a hemothorax may be difficult to determine. However, if this condition is suspected, the chest should be aspirated in order to establish the presence and extent of the hemorrhage. The bleeding may prove to be only an ooze. If so, repeated chest aspiration should be carried on until the bleeding ceases, but, in most cases of traumatic hemothorax, the bleeding artery should be exposed and ligated at once in order to save life.

Intra-abdominal hemorrhage with traumatic rupture of a viscus should be suspected in all cases of head injury accompanied by bodily injury. If the patient or a witness can describe the manner in which the accident occurred, this knowledge assists in determining whether the injury may have ruptured an abdominal viscus and produced a hemorrhage. If an abdominal viscus has been ruptured and is bleeding, the conscious patient may be able to define and localize the abdominal tenderness or pain. Localized muscle spasm and rigidity aid in the diagnosis. However, both the conscious and unconscious patient with intra-abdominal bleeding may show such symptoms as progressive shock, increasing peritoneal fluid, percussion dullness, and shifting dullness in the abdomen. In cases in which the clinical signs of abdominal hemorrhage are doubtful, exploratory aspiration of the peritoneal cavity will reveal evidence of intraperitoneal hemorrhage. Roentgenograms of the abdomen may demonstrate an elevated diaphragm, evidence of fluid around the intestines, and other indications of intraperitoneal bleeding. Howev-

er, if the patient's condition does not warrant the movement necessary to obtain roentgenograms, signs and symptoms previously discussed must be depended upon to establish abdominal bleeding.

The treatment of choice in intra-abdominal hemorrhage due to trauma of a viscus, whether in the presence of head injury or not, is immediate laparotomy and control of bleeding. Head injury may complicate the procedure by adding shock, which makes anesthesia more difficult to administer, but control of the intra-abdominal hemorrhage is so vital to life that it demands primary attention regardless of the head injury.

Shock is usually present with trauma and blood loss in cases of head injury alone and in those cases accompanied with bodily injury. Signs of shock are present whether the patient is comatose or awake. Identification of shock and its treatment vary little from ordinary cases of traumatic shock. Patients are pale, cold, and clammy, with a weak fleeting irregular pulse and a lowered blood pressure. As in most cases of shock, patients should (1) be given intravenous fluids, preferably blood, (2) be handled gently to avoid increasing the shock, (3) be kept warm and quiet and given small doses of Demerol to prevent aggravation of the shock, and (4) have active bleeding controlled surgically. Fluids containing *saline* should be avoided in head injuries as they increase cerebral edema and intracranial pressure. The quantity of fluids in patients with head injuries should be kept to a minimum, especially during the first twenty-four hours, since excess of fluids may aggravate the intracranial pressure. Usually the total fluids can be adequately limited in twenty-four hours to 2,000 cc.

Spinal fracture complicating head injury may require immediate attention in the first twenty-four hours. However, except for traction and splinting of the fracture, most treatment can be delayed.

Patients with *fractures of the lumbar spine and pelvis* can usually be put to bed on their backs with gentle traction to their legs for the first twenty-four hours. Reduction under anesthetic and application of plaster can, in most cases, be done after this period.

Simple fractures of the cervical spine may be treated with sand bags to the side of the head and with mild sedation. But fracture dislocations of the cervical spine demand immediate immobilization and application of skeletal traction to relieve or prevent spinal cord compression and paralysis. Such an injury in the presence of head injury and delirium requires all the acumen the physician can muster in order to prevent extensive spinal cord damage.

The pattern of treatment to follow when *fractures of long bones* complicate a case of head injury varies with the condition of the patient and the extent of the injury to the extremity. If active hemorrhage is present at the fracture site or if the blood supply to the extremity distal to the fracture is severely impaired, control of bleeding and correction of the problem of the blood supply to the extremity should be accomplished at once in spite of the head injury. Such a procedure, although extremely hazardous, is necessary when life is endangered or vitality of the extremity is at stake. The entire procedure may be performed under local anesthetic injected at the fracture site.

In most instances in which fracture of a long bone is not accompanied by severe bleeding or impairment of the blood supply of the extremity distal to the fracture, treatment of the fracture should be delayed only until the patient's condition has become stabilized. This delay simplifies the administration of the anesthetic and reduces the hazard to life. During this period of stabilization, whether the fracture is simple or compound, the extremity can be splinted, immobilized, and placed in traction.

The physician does not need to wait until the patient has regained consciousness to carry out the treatment described. If his pulse, respirations, and blood pressure have remained stabilized for several hours and his oxygen-carrying mechanism is functioning fully, whether he is conscious or not, he can withstand the surgical trauma well. If the patient's brain is protected during anesthesia with an excess of oxygen, brain damage does not increase.

Up to this point, matters which require the most emergent treatment in the first twenty-four hours in patients with head injuries have been reviewed. In the order of their relative importance they are: (1) gentleness in handling; (2) relief of asphyxia and tracheal obstruction; (3) treatment of external bleeding from scalp and brain or body surfaces; (4) evacuation and arrest of middle meningeal hemorrhage, control of intercostal bleeding into the pleural cavity, and control and arrest of intra-abdominal bleeding; (5) control of shock; and (6) management of spinal and extremity fractures and dislocations.

Problems encountered and methods of treatment used which are of more general importance in the care of the patient with an acutely injured head can now be considered. Many of the problems and methods of treatment begin with the initial care of the patient and continue until his discharge from the hospital.

Shock may be limited to the first twenty-four hours but may also extend beyond this period. Extensive bodily injuries in addition to the head injury add to the severity of the shock and its duration, but proper handling of patients materially reduces the degree of shock. In cases of traumatic shock without head injury, morphine is used to control pain and reduce shock. In patients with a minor head injury and painful bodily injury, small doses of morphine are not contraindicated. However, in the stuporous patient with clinical evidence of increased intracranial pressure and medullary embarrassment, morphine and morphine-like drugs are potential hazards which should be avoided.

Warmth always assists in the control of shock. Intravenous glucose, plasma substitutes, plasma and blood should be used, *but intravenous saline must be avoided in cases of head injury as it aggravates cerebral edema and increases intracranial pressure.*

Convulsions occasionally complicate convalescence after head injury. When the brain is contused, edematous, and hemorrhagic, especially in the motor area, the increased cortical irritability is sometimes sufficient to initiate seizures. These seizures usually appear only in the period of cerebral edema and may be almost intractable to treatment. Under no circumstances should they be allowed to continue, as they increase both intracranial pressure and cerebral anoxia, both of which are detrimental to brain recovery. Moderate doses of barbiturates or drip Pentothal and oxygen are usually sufficient to control the seizures. However, in more severe cases, inhalation anesthesia may be necessary.

Stupor and coma complicate the care of the patients with head injury, for these patients cannot voice their complaints. In such cases, general activity, character of the pulse and respirations, and temperature and blood pressure properly evaluated indicate the condition and course to follow. The changes in the degree of stupor and coma from hour to hour and from day to day together with changes in vitality and reflex responses determine the need for a particular type of treatment. To be of value, these changes should be *recorded* from time to time.

Cerebral edema often must be combated throughout a greater part of the hospitalization period. In most patients, special treatment directed to the cerebral edema is not necessary. However, when clinical evidence of severe increased intracranial pressure appears, special measures must be instituted. When evidence of medullary embarrassment is shown by a slowed pulse, slowed respiration, mild cyanosis, or occa-

sional periods of Cheyne-Stokes respiration, oxygen should be administered and intermittent intravenous injections of 25 to 50 cc. of 50 per cent glucose should be given. If these measures fail, trephining or subtemporal decompression may be necessary. Occasionally, subdural hemorrhage or collection of fluid must be removed surgically.

Mucus is a source of trouble in the comatose patient with a poor cough reflex and difficulty in swallowing. Turning him may assist in expelling the mucus. However, use of motor suction may be necessary to clear the trachea and bronchi of mucus. When a catheter is employed to aspirate the trachea and bronchi, the procedure should be well supervised to make sure the catheter is passed deeply enough to clear the bronchi of mucus. Suction should be intermittent and supplemented with potassium iodide to liquefy secretions.

Paralysis occurring immediately after injury should affect the management of a case very little. However, if paralysis develops during hospitalization, it is indicative of a progressive brain or spinal cord lesion and requires attention.

Bleeding and spinal fluid drainage from the nose and ears are indicative of basal skull fracture. Before the era of antibiotics, this condition was often a fatal complication. Now the only requirements in addition to antibiotics are to keep the patient's nose and ears clean and to prevent him from blowing his nose or sneezing.

Fever can usually be controlled by temperature sponging. But even ice packing fails in some cases to reduce temperature. Severe peripheral vasoconstriction of central origin occurs in some patients, and the blood is pooled in the splanchnic area. Rectal instillation of 4 to 6 oz. of water drawn off ice and repeated as often as every two hours reduces the temperature by cooling the blood in the splanchnic area.

The position in bed of the patient with an injured head may assist or retard his recovery. In my experience, the Trendelenburg position has invariably been detrimental. This position produces an increase in intracranial venous pressure which consequently elevates the intracranial pressure and results in extension of the brain injury, deepening coma and causing death. During treatment for shock, the patient should be kept flat and receive intravenous fluids until the shock is controlled. Then a semi-Fowler's or semisitting position will diminish intracranial pressure by reducing cerebral venous pressure and help prevent regurgitation during feeding.

*Bedsore*s occur quickly in a comatose patient if he is not turned regularly and often to prevent

pressure points from developing. Placing pillows, not inflated rings, beneath the body or extremities minimizes the pressure areas.

The use of *spinal puncture* in the active treatment of the patient with an acutely injured head is a moot point. Many insist that the procedure be performed immediately as a diagnostic and therapeutic measure in spite of the patient's condition. Others adhere to a rule forbidding its use at any time. I believe in a middle course. Any medical examination or treatment should be carried out according to indications for its use. This rule also applies to spinal puncture.

Spinal puncture should be performed in cases in which the anticipated findings may be of some benefit in establishing diagnosis or treatment. If knowledge of the spinal fluid pressure or the chemical or bacteriologic contents of the spinal fluid would assist in establishing the diagnosis and outlining the treatment in an individual case, spinal puncture should be performed. However, in cases in which increased intracranial pressure, demonstrated by slow pulse, slow respirations, and Cheyne-Stokes respiration, is present, extreme caution should be exercised. A small needle should be used and only a very little fluid should be removed.

Antibiotics are in such common use at present that very little direction is necessary. If infection is feared, prophylactic administration is indicated. When infection develops, much larger doses may be necessary.

Sedatives should be used cautiously. When patients are wild and delirious, massive doses of barbiturates may be necessary. However, such doses may prove fatal unless carefully supervised. Chloralhydrate and paraldehyde are less depressing than the barbiturates and may be more effective. Under no circumstances should standing orders be left for medium or large doses of sedatives. The administration of each large dose should be preceded by a current evaluation of the patient's clinical symptoms.

The entire problem of management of the patient with an acutely injured head has been difficult to cover in this brief period. However, the most urgent problems have been reviewed. In the first twenty-four-hour period after injury, these patients may require very little treatment — often merely supervised bed rest — or the utmost care, such as radical surgery of the head, chest, abdomen, or extremities, depending on the severity of the head injury and the associated injuries. Care in judiciously evaluating every symptom and sign before instituting therapy is of extreme importance. After treatment is begun, it must be followed with utmost caution.

Lancet CLINICAL REVIEWS

This department of THE JOURNAL-LANCET is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

Adrenal Cortical Hyperfunction Associated with Metastatic Bronchogenic Carcinoma

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IN RECENT YEARS, attention has been drawn to the occasional occurrence of Cushing-like syndromes associated with carcinoma of the lung, especially small-cell tumors.^{1,2} The purpose of this paper is to present such a case observed at the Minneapolis Veterans Administration Hospital. The patient's illness covered a period of two months. The increased adrenal cortical activity was suspected because of hypopotassemic alkalosis and was established by adrenal steroid studies to be described below.

CASE REPORT

A 46-year-old white male was admitted to the Minneapolis Veterans Administration Hospital on January 29, 1955, and died on February 22, 1955. He had been perfectly well until about December 20, 1954, at which time a nonproductive cough, fever, and pleuritic pain developed in the left side of his chest. He was admitted to the hospital in his local community and treated for eight days with penicillin. He was told that he had virus pneumonia. He felt better at the time he was discharged, but the cough persisted. His condition remained poor, and he was admitted to the Sioux Falls Veterans Hospital on January 13, 1955. At that time, additional symptoms developed: namely, hemoptysis, hoarseness, and swelling in the left arm and both legs. His appetite continued to be good, and he had not vomited at any time. History failed to reveal hypertension or diabetes mellitus. He had smoked half a package of cigarettes daily since the age of 12. At the Sioux Falls Veterans Hospital, a chest roentgenogram revealed a homogeneous

mass occupying the middle third of the left lung field. A presumptive diagnosis of carcinoma of the lung was made, and the patient was transferred to Minneapolis for further evaluation.

The physical examination on admission revealed a chronically ill white male who was moderately dyspneic. The neck veins were distended and the trachea was deviated to the right. Moderate pitting edema of the left arm and both legs was present. The fingers were not clubbed. Examination of the chest revealed dullness and absent breath sounds throughout the left lung field. The heart was normal except for a sinus tachycardia of 100. The blood pressure was 140/100. The liver was firm and nodular and was palpable 8 cm. below the right costal margin, and ascites was demonstrable. In the left axilla, hard nodes were matted together. Indirect laryngoscopy revealed paralysis of the left vocal cord. A tentative diagnosis on admission to Minneapolis Veterans Administration Hospital was carcinoma of the left lung, metastases to the left axillary lymph nodes and to the liver, and superior vena caval obstruction.

Laboratory studies were as follows: urinalysis, trace of albumen and sugar; specific gravity, 1.024; hemoglobin, 12.9 gm. per 100 cc.; leukocyte count, 12,550, with a normal differential count; erythrocyte sedimentation rate (Westergren), 54 mm. per hour; serologic tests for syphilis, negative; blood urea nitrogen, 13 mg. per 100 cc.; fasting blood sugar, 232 mg. per 100 cc. The most striking abnormality was hypochloremia and hypopotassemia as charted in table 1. The urinary 17-hydroxy-corticoids³ were studied and found to be extremely high, between 71.7 and 90.7 mg. per twenty-four hours. The normal value in our laboratory ranges from 1.0 to 12.0 mg. per twenty-four hours. The plasma corticoid level⁴ was found to be 57.0 μ g. per 100 cc.; the normal range in our laboratory being 5.0 to 25 μ g. per 100 cc. The 17-ketosteroid excretion in the urine⁵ was 22.0 mg. per twenty-four hours. The sputum cultures grew out predominately *Escherichia coli* as well as *Streptococcus viridans* and *Neisseria*. Acid-fast bacilli were not found on

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direct smear or culture of the sputum. A chest roentgenogram confirmed the clinical impression of a left pleural effusion, and 2,000 cc. of bloody fluid was removed from the left pleural cavity by thoracentesis. Tumor cells were not demonstrated in the fluid.

The patient continued to eat well and remained alert; however, his condition gradually deteriorated. A biopsy of the mass in the left axilla was done, but the pathologic specimen did not contain tumor cells. Bronchoscopy was similarly unrewarding, and the patient died before a tissue diagnosis was made. Shortly after admission, the hypopotassemic alkalosis was noted. A 4-gm. dose of potassium chloride was given orally per day, and, in two weeks, the serum potassium and chloride were within normal limits. The patient died quietly on February 22, 1955, and an autopsy was performed.

AUTOPSY FINDINGS

When the chest was opened a large tumor mass was seen lying in the left mediastinum, measuring 14 by 7 by 8 cm. in diameter. The left pericardium had been invaded, and implants were noted about the root of the aorta. The left lower lobe of the lung was one large necrotic tumor mass. Microscopic sections of the tumor revealed a small-cell carcinoma.

The liver weighed 4,000 gm. and was studded with tumor nodules. The tumor had replaced approximately 70 per cent of the liver. The spleen was normal. A small tumor nodule was present in the right kidney; the left kidney was normal. There was a 2-cm. tumor nodule in the body of the pancreas.

No abnormality was noted in the brain; the pituitary gland was normal.

The adrenal glands were carefully studied. The cortices measured 13 mm. and the zona fasciculata and zona reticularis were somewhat prominent. The right adrenal weighed 12.0 gm. and the left weighed 13.5 gm. However, there were no metastatic nodules in the adrenal glands.

The bone marrow contained tumor cells. Microscopic examination of the tumor nodules in the right kidney, the pancreas, and the liver revealed the same cell type as was found in the tumor mass in the lung.

DISCUSSION

This patient demonstrated an abnormality in the serum electrolytes which is identical to that found in many patients with Cushing's syndrome and was undoubtedly secondary to the elevation in the circulating adrenal corticoids. This case is quite similar to the case reported by Spaulding¹ from the Toronto General Hospital. The explanation for the adrenal cortical activity is not clear. The possibility of an adrenal cortical tumor with metastases to the liver and lung was considered but deemed unlikely because of the normal 17-ketosteroid excretion. The drop in the level of urinary 17-hydroxycorticoids when the patient was given 9 alpha fluorohydrocortisone as depicted in table 1 is suggestive of the response of patients with adrenal hyperplasia when given cortisone or related compounds in whom a pronounced drop in the urinary excretion of 17-ketosteroids is noted.⁵⁻⁷ There were no adrenal metastases. The possibility exists that the carcinomatosis caused a stress reaction with an exaggerated response by the adrenal gland.

Plotz⁸ reviewed 114 cases of Cushing's syndrome which were autopsied and noted that 9 per cent of these cases were associated with tumors of the pancreas or thymus. In 1952, Thorne² reported 2 cases of Cushing's syndrome occurring in patients with bronchogenic carcinoma. His cases were characterized by short courses with evidence of widespread metastases, as was the case in our patient, although both of his patients demonstrated the classical clinical picture of Cushing's syndrome. One of his patients had normal adrenal glands and the

TABLE 1
SERIAL VALUES FOR BLOOD UREA NITROGEN (BUN), SERUM CARBON DIOXIDE (CO₂), SERUM CHLORIDE (Cl⁻), SERUM SODIUM (Na⁺), SERUM POTASSIUM (K⁺) AND 17-HYDROXYCORTICOSTEROID EXCRETION

Date	BUN mg. per 100 cc.	CO ₂	Cl ⁻	Na ⁺ mEq./l	K ⁺	Urinary 17-hydroxycorticoids mg. per 24 hours
January 30, 1955				142	2.1	
February 2, 1955	13	46	81	142	2.1	
*February 3, 1955						
February 4, 1955		38	79	140	2.5	
February 5, 1955						78.4
February 6, 1955						84.3
February 7, 1955	16	39	86	137	2.6	
February 13, 1955						90.7
February 14, 1955	18	27	100	133	5.4	71.7
†February 16, 1955						53.6
†February 17, 1955						37.1
February 21, 1955	20	22	100	130	5.6	

*Institution of 4 gm. of potassium chloride daily orally.
†1 mg. 9 alpha fluorohydrocortisone q.i.d. by mouth.

other showed "considerable adrenal hyperplasia." He found 11 case reports of Cushing's syndrome occurring with intrathoracic neoplasms. In most of these cases, the primary tumor was thought to arise in thymic tissue.

CONCLUSION

The purpose of this paper has been to present another case of carcinoma of the lung in which a pronounced abnormality in the serum electrolytes was noted. Alkalosis with hypopotassemia and hypochloremia was the initial clue to the possibility of increased adrenal cortical activity.

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This was confirmed by an elevation of the plasma 17-hydroxycorticoids and an increased excretion of 17-hydroxycorticoids. Depression of steroid excretion accomplished with 9 alpha fluoro-hydrocortisone strongly supported the diagnosis of adrenal hyperplasia rather than tumor. The postmortem diagnosis was small-cell carcinoma of the lung, with metastases to the liver, heart, pancreas, right kidney, and bone marrow. The pituitary gland was normal and the adrenal glands demonstrated a slight prominence of the zona reticularis and zona fasciculata but were otherwise normal.

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Etiology of Chronic Alcoholism, by OSCAR DIETHELM, M.D. Contributions by MARY SHERFEY, M.D., FREILE M. FLEETWOOD, M.D., FRED BLEULER, M.D., and MILTON L. BARNETT, Ph.D., 1955. Springfield, Illinois: Charles C Thomas. 227 pages. \$6.75.

It is refreshing to read a carefully thought out, scientific study on *alcoholism*, a subject about which there has been so much loose thinking and oversimplification. This work is multidisciplinary in nature as it includes studies by internists, psychiatrists, physiologists, chemists, social scientists, and anthropologists.

An attempt is made to define the basic nature of chronic alcoholism psychopathologically. The terms used are carefully defined. Traditional and superficial descriptive approaches are criticized. In the psychopathologic study, a total of 161 cases were selected. Of this group, the authors were able to delineate and describe 11 different diagnostic types. These range from alcoholism occurring in familiar diagnostic categories, such as paranoid schizophrenia or psychopathic personality to other less usual groupings, such as "rigidly organized obsessive-compulsive personality," "rigidly organized neurotic personality with paranoid features," or "poorly organized inadequate psychoneurotic personality."

The significance of the emotions



of anxiety, tension, and resentment was studied in relation to alcohol consumption in alcoholic patients and in controls. The authors report that anxiety is accompanied by the presence in the blood of a substance similar to norepinephrine in its effects on the rabbit duodenum and the rat colon and uterus. The intensity was found to correspond with the concentration of the "anxiety substance" in the blood. Ingestion of alcohol only slightly reduced the noradrenergic substance.

Muscular tension was found to be associated with a cholinergic-like substance demonstrated on frog and rabbit preparations. Tension was completely abolished in alcoholic patients and modified in nonalcoholics by the ingestion of 6 oz. of whiskey. Similarly, the emotion of resentment was found to be associated with a "resentment substance" tested on the rabbit duodenum. This substance was consistently higher in the alcoholic pa-

tient than in the nonalcoholic, and was reduced significantly by alcohol.

The last two sections of the book deal with cultural comparisons. One compares Swiss and American alcoholic patients. The other is an anthropologic study of alcoholism in the Cantonese of New York City.

The book is readable and informative. It is a valuable contribution to our knowledge of alcoholism and should be of interest particularly to physicians, psychiatrists, psychologists, and sociologists.

BURTRUM C. SCHIELE, M.D.

•
Review of the Natural Childbirth Primer, by GRANTLEY DICK READ, M.D., 1955. New York City: Harper & Brothers. \$1.50.

This little book is now available to all expectant mothers at a reasonable price. Dr. Read has helped many women with his belief that if a woman does not fear childbirth, she can probably go through labor with much less pain than she would otherwise experience. He feels that if women would approach labor without much fear, many would not need anesthesia, and they would then have the pleasure of knowing when their baby was born.

Dr. Read feels strongly that during the later months of pregnancy the husband can be a great help if he is sympathetic and understanding.

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American College Health Association News . . .

S. K. Hall, M.D., head of the Department of Student Health at Carnegie Institute of Technology in Pittsburgh is retiring this summer. Dr. Andrew W. Speer has been appointed to replace him.

Dr. Hall has accepted a position on the staff of the Veteran's Administration Hospital at Erie, Pennsylvania.

Roxie A. Weber, M.D., director of the Health Service at Oklahoma A & M College at Stillwater, announces the appointment of Dr. A. C. Scott of Illinois to her staff.

Benjamin A. Reiter, M.D., of Fairfield, Connecticut, will join the staff of the Students' Health Service at the University of Minnesota this fall.

The University of Minnesota, through the facilities of its Center for Continuation Study, announces a conference on Campus Marriages to be held October 25 through 27, 1956. This conference which will consider problems facing colleges and universities both now and in the future, will examine such areas as housing, counseling, health services, economic aid, and recreation. Registration will be open to accredited administrative or special representatives from any college or university interested in the married student. The fee will be \$25 per person. All sessions of the conference will be held at the Center for Continuation Study at the University of Minnesota, Minneapolis. Housing at the center will be available to the registrants at a nominal cost.

News Briefs . . .

North Dakota

NEW OFFICERS of the North Dakota State Medical Association elected at the joint meeting of the North and South Dakota State Medical Associations in Aberdeen are: Dr. R. H. Waldschmidt, Bismarek, president; Dr. R. W. Rogers, Dickinson, president-elect; Dr. O. A. Sedlak, Fargo, first vice president; Dr. J. C. Fawcett, Devils Lake, second vice president; Dr. E. H. Boerth, Bismarek, secretary; Dr. E. J. Larson, Jamestown, treasurer; Dr. G. A. Dodds, Fargo, speaker of the house of delegates; Dr. R. E. Leigh, Grand Forks, vice speaker

of the house; Dr. W. A. Wright, Williston, delegate to the A.M.A.; Dr. T. E. Pederson, Jamestown, alternate delegate. Councilors are: Dr. V. G. Borland, Fargo, first district; Dr. G. V. Toomey, Devils Lake, second district; Dr. N. A. Youngs, Grand Forks, third district; and Dr. C. H. Peters, Bismarek, sixth district.

DR. E. A. HAUNZ, of the Grand Forks Clinic, was elected chairman of the Board of Governors of the American Diabetes Association at its recent convention in Chicago.

DR. MARTIN HOCHHAUSER, of Garrison, was elected president of the North Dakota Diabetes Association at the meeting of the North and South Dakota State Medical Associations.

(Continued on page 22A)

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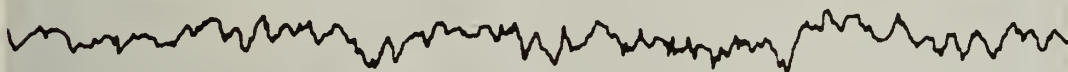
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WHAT IS THE DIFFERENCE BETWEEN A TRANQUILIZER AND A SEDATIVE?

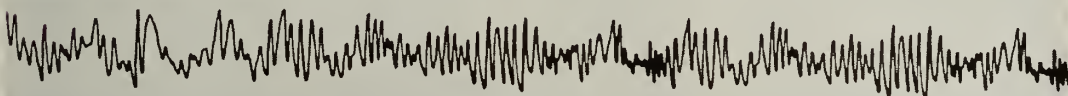
*Comparison of the effect of Raudixin (tranquilizer) and a
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NEWS BRIEFS

(Continued from page 20A)

DR. ARTHUR C. BURT was elected president of the North Dakota Hospital Service Association at the annual meeting held in conjunction with the meetings of the North and South Dakota State Medical Associations. Other officers are: Dr. Joseph Sorkness, Jamestown, first vice president; Dr. Martin Hochhauser, Garrison, second vice president; Dr. E. H. Boerth, Bismarck, secretary; and Dr. Hugh W. Hawn, Fargo, treasurer.

• • • • •

DR. WALTER J. BO, of the University of North Dakota, recently received a grant of \$3,550 from the National Vitamin Foundation for research in: (1) continuation of the histologic and histochemical study of the relationship between vitamin A and estrogen in producing uterine metaplasia in the rat, and (2) a histochemical and biochemical study of the liver glycogen in vitamin A deficient rats.

• • • • •


THE NORTH DAKOTA CANCER SOCIETY presented its sixth annual Cancer Caravan late in April. Guest speakers were: Dr. Joseph D. Boggs and Dr. William A. Riker, of Children's Memorial Hospital, Chicago; and Dr. James B. Arey and Dr. George Pilling, of St. Christopher's Hospital, Philadelphia. The topic discussed was "Malignant Tumors in Children." The towns visited were: Williston, Minot, Devils Lake, Grand Forks, Fargo, Jamestown, Bismarck, and Dickinson.

• • • • •

DR. JAMES O'TOOLE, who recently completed a residency at St. Luke's Hospital, Fargo, has become associated with Dr. H. R. Piltingsrud in the clinic at Park River.

(Continued on page 24A)

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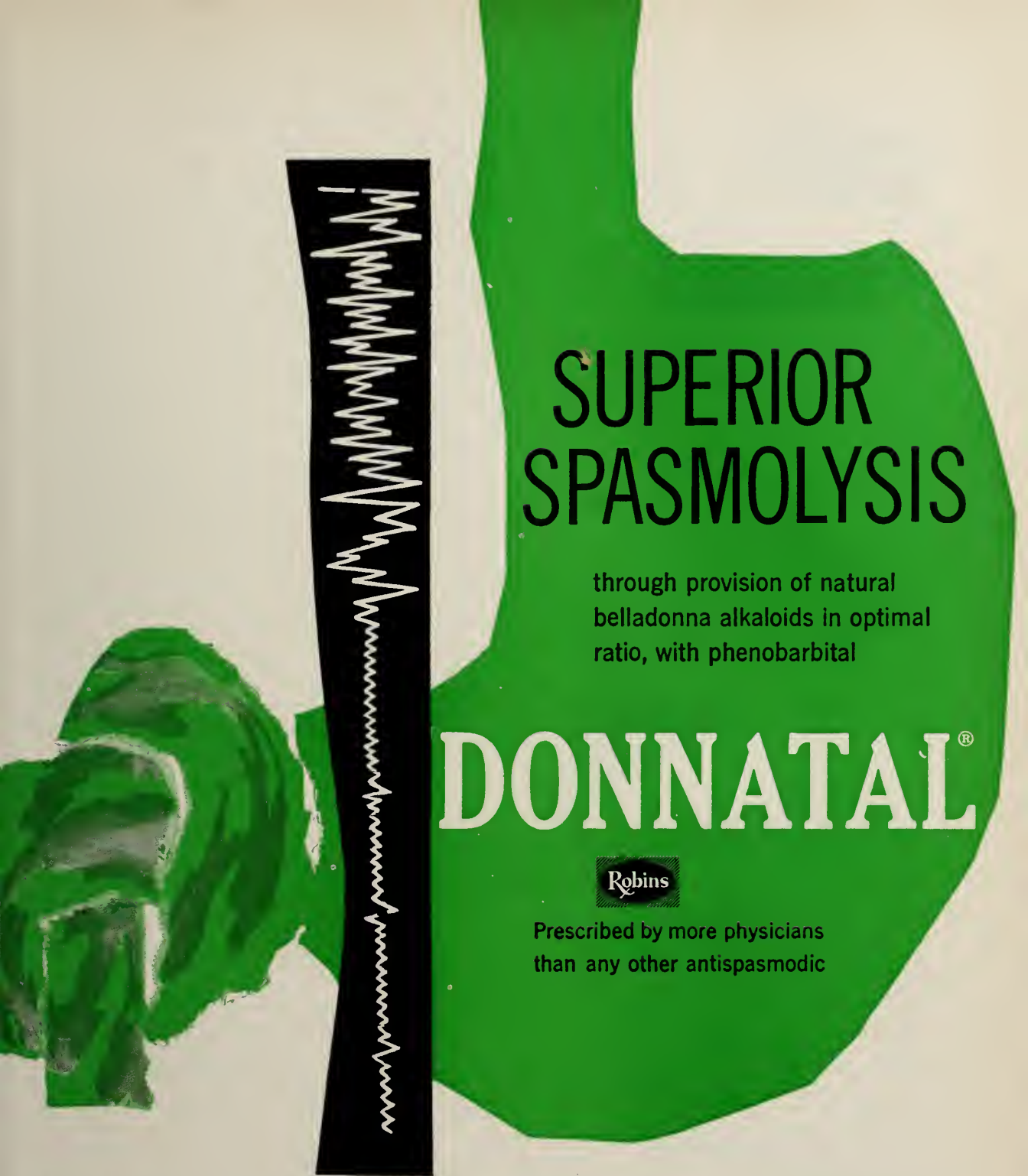


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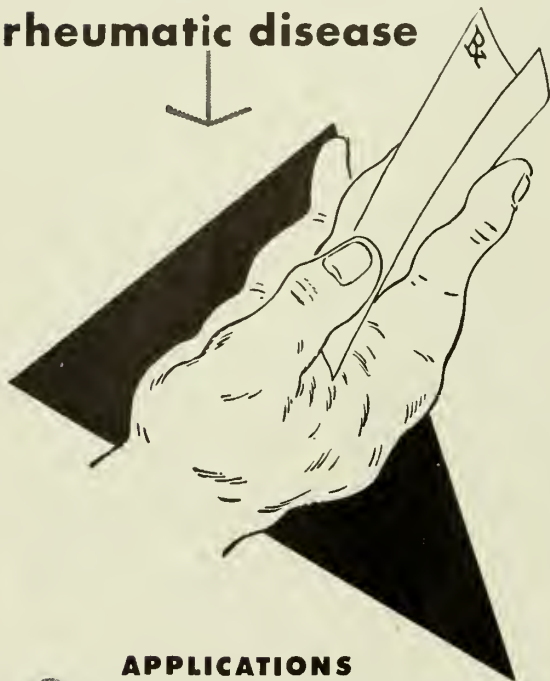
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NEWS BRIEFS

(Continued from page 22A)

Minnesota

THE SOUTHERN MINNESOTA MEDICAL ASSOCIATION will hold its annual meeting September 10 at New Ulm. Papers to be presented at the morning session are: *Case Report: Obstetric Hemorrhage into the Broad Ligament*, by CORNELIUS A. SAFFERT, M.D., New Ulm; *The Retarded Child: Diagnosis and Treatment*, by W. S. CHALGREN, M.D., Mankato; *The Degenerative Low Back Syndrome*, by DONALD R. LANNIN, M.D., St. Paul; *Hypnotic Treatment of Neurodermatitis in 20 Cases*, by OTTO B. FESENMAIER, M.D., New Ulm; *Current Advances in Antibiotic Therapy*, by J. E. GERACI, M.D., Rochester; *Excision of Lower Cervical Lymph Nodes: Its Role in Diagnosis*, by O. H. BAEIRS, M.D., Rochester; *Case Report: Afibrinogenemia*, by GEORGE R. MCNEAR, JR., M.D., Mankato.

Papers to be presented at the afternoon session are: *Extrathyroidal Hypermetabolism Associated with Pheochromocytoma*, by D. A. SCHOLZ, M.D., Rochester; *Subdural Empyema of the Brain: Diagnosis and Treatment*, by ALFRED UHLEIN, M.D., Rochester; *Office Diagnosis and Treatment of Sinusitis*, by JOHN C. LILLIE, M.D., Rochester; *Management of Aneurysms of the Thoracic and Abdominal Aorta*, by J. W. KIRKLIN, M.D., Rochester; *Chlorodane Poisoning*, by CLAYTON E. NELSON, M.D., Albert Lea; *Chorio-epithelioma*, by HARRY B. NEAL, M.D., Albert Lea; *Newer Concepts in the Treatment of Ulcerative Colitis*, by LOREN E. NELSON, M.D., St. Paul; *Use of Intramedullary Nails in the Treatment of Pathologic Bone Conditions*, by E. W. JOHNSON, JR., M.D., Rochester; *Obstructive Uropathies in Children*, by BRUCE LINDERHOLM, M.D., Minneapolis.

• • • •

DR. HENRY W. WOLTMAN, one of the foremost neurologists in the United States, retired from active practice July 1, after thirty-seven years as a member of the Mayo Clinic staff. Dr. Woltman was one of the founders of the American Board of Psychiatry and Neurology and past president of the Minnesota Society of Neurology and Psychiatry, the Central Neuropsychiatric Association, the Association for Research in Nervous and Mental Diseases, and the American Neurological Association. He was president of the Mayo Clinic staff in 1946.

• • • •

DR. and MRS. IRVINE MCQUARRIE sailed July 2 from San Francisco for Honolulu, where Dr. McQuarrie will be director of medical education at Children's Hospital. Dr. McQuarrie was professor and chairman of the department of pediatrics at the University of Minnesota at the time of his retirement in 1955. He had served the University for twenty-five years.

South Dakota

NEW OFFICERS of the South Dakota Medical Association elected at the joint meeting of the North and South Dakota State Medical Associations in Aberdeen are: Dr. A. P. Peeke, Volga, president; Dr. M. M. Morrissey, Pierre, president-elect; Dr. F. F. Pfister, Webster, vice president; Dr. C. R. Stoltz, Watertown, speaker of the house of delegates. Councilors re-elected are: Dr. P. McCarthy, Aberdeen; Dr. L. C. Askwig, Pierre; and Dr. T. H. Sattler, Yankton. Dr. A. A. Lampert, Rapid City, was re-elected representative to the American Medical Association; and Dr. A. P. Reding, Marion, was re-elected alternate representative.

COMING in *October*...

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- The Transactions of the North Dakota State Medical Association are concluded in this issue. Reports of the reference committees; changes in the constitution; an address by Dwight H. Murray, M.D., president-elect of the American Medical Association; and reports of the Woman's Auxiliary comprise most of this section of the proceedings. Also included is a membership roster of both the North Dakota State Medical Association and the Woman's Auxiliary.

- In spite of the fact that some disk operations have reportedly produced excellent results, postoperative pain and limited movement continue to occur. These disturbing after effects can be overcome to a great extent by using methyl acrylic to reconstruct the interspace after disk removal. This procedure, resulting in near normal physical activity and relief of discomfort, is described in "Interspace Reconstruction and Spinal Stabilization after Disk Removal" by David Cleveland, M.D., professor and director, department of neurologic surgery at Marquette University School of Medicine, Milwaukee.

- "Cobalt-Iron Therapy in the Treatment of Some Common Anemias Seen in General Practice" by Donald C. Ausman, M.D., of the Ausman Clinic, Milwaukee, presents the results of a study of 44 patients treated in this manner. Anemia associated with arthritis, carcinoma, hypothyroidism, gastrointestinal abnormalities, and iron-deficiency anemia caused by menstrual blood loss or pregnancy were among the conditions studied. In some patients, improved hematologic status was maintained after therapy was discontinued. Response was particularly good in patients with iron-deficiency anemia resulting from menstrual blood loss or pregnancy.

- Without the advantages of a college education, the physically handicapped person may never be able to attain economic independence. "College Education for the Handicapped Student" by Frederic J. Kottke, M.D., professor and head, department of physical medicine and rehabilitation at the University of Minnesota, discusses the problems facing these students. The necessity of adapting college facilities and courses to their needs is stressed, and the many ways in which a rehabilitation counselor can be of help is pointed out.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA MEDICAL CONTINUATION COURSES

September 25-27—Pediatrics for Pediatricians.

October 18-20—Technics in General Practice.

October 22-24—Gynecology for General Physicians.

November 5-9—Radiation Therapy for Radiologists.

November 19-21—Fractures for General Physicians.

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

NORTH DAKOTA SOCIETY OF OBSTETRICS AND GYNECOLOGY

The North Dakota Society of Obstetrics and Gynecology will meet October 18 and 19 in Dickinson, North Dakota. Speakers will be Dr. Maurice Grier of Omaha; Dr. Arthur Hunt of the Mayo Clinic; Dr. Jack Pierce of Virginia, Minnesota; and Dr. John Moore of Grand Forks. All interested physicians wishing to attend and to join the subsequent pheasant hunt will be most welcome.

FALL REFRESHER COURSE

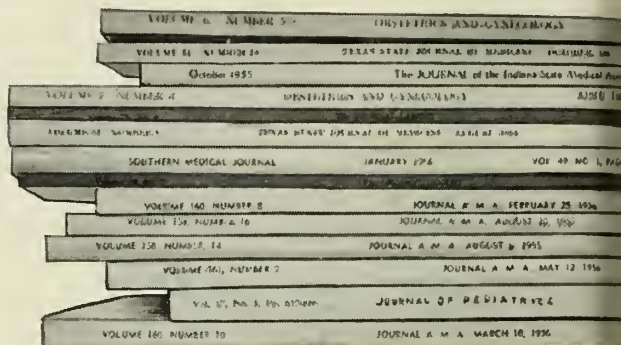
The Academy of General Practice announces the sixth annual Fall Refresher Course to be held at the Prom Ballroom, St. Paul, October 17, 8:30 P.M. to 5:30 P.M. The 14 speakers will discuss a variety of subjects. Registration fee, including luncheon, is \$10. Address inquiries to James A. Blake, M.D., 15 9th Ave., So., Hopkins, Minn.

RHINOLOGIC SOCIETY TO MEET

The American Rhinologic Society will hold its annual meeting in Chicago, October 9 through 13. The first evening will be devoted to a business session. Surgical demonstrations and seminars will be presented the next three days at the Illinois Masonic Hospital. The scientific program will be presented at the Palmer House on the closing day. For further information, write Mrs. Mabel Campbell, Corresponding Secretary, 834 Wellington Ave., Chicago 14.

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Gastrointestinal Allergy to Cow's Milk in the Neonatal Period

ROBERT B. TUDOR, M.D.

Bismarck, North Dakota

MANIFESTATIONS of gastrointestinal allergy in children are well known to the pediatrician and the allergist.^{1,2} However, such disorders probably need emphasis from time to time for the general practitioner. This type of allergy is most commonly due to cow's milk. The first allergic symptoms usually occur from birth to four months of age. At this time, the intestine may be sensitive when the skin is not. Skin testing is usually inconclusive. The most common symptoms of gastrointestinal allergy due to cow's milk are colic, vomiting, diarrhea, nasal stuffiness, cough, wheezing, and shock.

Unless the child is sensitive to the lactalbumin of the cow's milk, goat's milk is not a successful substitute because the casein is identical in cow's and goat's milk. Soy bean milk, a weak sensitizing protein, is usually the best milk substitute.

CASE REPORTS

Case 1. C. B. weighed 4 lb. 15½ oz. at birth. She was said to have been born at term. The mother was Rh negative, and a direct Coombs' test on the cord blood was negative. The family history was positive for hay fever and asthma. The baby was kept in oxygen until the age of 5 days. Dryco formula was started on March 5, 1956. She left the hospital at the age of 10 days, weighing 5 lb. 7 oz. At this time, she was taking an evaporated milk formula plus accessory vitamins. At the age of 2 weeks, she began to cry continually. These crying spells seemed to be associated with stomach-ache, and she seemed worse in the afternoons and evenings. Physical and rectal examinations were essen-

tially normal. She cried continually while in the office. She was started on Mull-Soy, and within four days was much improved and has not had colic since that time.

Case 2. K. M. was born at term and weighed 6 lb. 10½ oz. The mother was Rh positive. The infant left the hospital with the mother on the fourth day. She was breast fed. At the age of 3 weeks, she began to cry continually and nothing seemed to satisfy her. The mother then put her on an evaporated milk formula and also started to give her cereal and fruit. At the age of 6 weeks, examination disclosed a well-nourished child who weighed 10 lb. 8 oz. and who cried all during the examination. The anus showed a grade I stenosis. This was dilated. She was started on Mull-Soy. Within four days, she stopped crying and apparently was no longer troubled with stomach-aches. Examination at the age of 2 months disclosed a well-nourished child who weighed 11 lb. 3 oz. The anus at that time seemed normal. She was continued on Mull-Soy and also started on strained meat. She has been free from colic.

Case 3. R. W. was a white male who was put on evaporated milk at birth and who began to vomit his feedings at about two weeks of age. The family history was contributory in that the father had stomach ulcers. He was a well-nourished and well-developed child. During periods of vomiting, he did not pass stools, and no fever was associated with the vomiting. He always seemed hungry. Roentgenograms of the chest and stomach were normal, and an intravenous pyelogram was normal. Urine was normal. Hemoglobin was 70 per cent. White blood count was 7,600 with polymorphonuclears 37 per cent and lymphocytes 63 per cent. At the age of 2 months, he was started on Mull-Soy. Since that time, he has improved greatly and has not vomited.

Case 4. L. K. was born approximately 2 weeks early. She weighed 4 lb. 11 oz. at birth. The family history was negative for allergies. She was kept in oxygen for 5 days. She was started on Dryco at the age of four days. At the age of 8 days, she began to have loose stools continually. Her formula was adjusted, and she was given glucose feedings as well as parenteral feedings. Stool culture showed no intestinal pathogens. Her

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blood and urine tests were normal. At the age of 21 days, she was started on Mull-Soy, and since that time has not had diarrhea. She was started on homogenized cow's milk at the age of 1 year and did well until the age of 2 years when she developed a mild atopic eczema of the face. This condition responded to conservative therapy.

Case 5. D. E. weighed 8 lb. 9 oz. at birth. He was put on evaporated milk at birth. At the age of 1 month, a chronic diarrhea developed with recurring stomach cramps. Some blood had appeared in his stools. An older child was sensitive to cow's milk but could take Mull-Soy. The mother is allergic to penicillin. Examination disclosed a well-nourished, irritable child. Stool examination was normal. The stool culture was normal. Urine was normal. Hemoglobin was 64 per cent. White blood count was 6,800 with polymorphonuclears 36 per cent, lymphocytes 63 per cent, and eosinophils 1 per cent. Bleeding time was three minutes; clotting time, four minutes; and prothrombin time, 100 per cent. Proctoscopic examination was normal. Colon roentgenogram was normal. Skin tests were positive to cow's milk, wheat, tomatoes, spinach, apple, oat, beef, and corn. He was started on Mull-Soy and has had no more difficulty.

Case 6. M. S. was born at term and weighed 7 lb. 9 oz. A rash developed at 1 month of age, after Vi-Penta was started, and a cough and stuffy nose developed at about 2 months of age. He was taking evaporated milk, fruit, cereal, and vegetables by the time he was 2½ months old as he always seemed hungry. He was a well-nourished child who did not appear ill. Hemoglobin was 66 per cent. White blood count was 8,400 with polymorphonuclears 11 per cent and lymphocytes 86 per cent. The nasal smear showed no eosinophils. Chest roentgenogram was normal. At 5 months of age,

expiratory wheezing developed. At this time, the chest roentgenogram was clear. Sinus roentgenograms showed maxillary and ethmoid sinusitis. Duodenal enzymes were normal. He was given goat's milk and had no more difficulty. After he started goat's milk, he was seen at the age of 12 months for a smallpox vaccination, and at this time the parents stated that the previous symptoms of stuffiness or wheezing had not recurred.

Case 7. D. H. was born at term. He weighed 7 lb. ¼ oz. He seemed perfectly normal in the hospital. He left the hospital while on an evaporated milk formula. At the age of 5 days, diarrhea developed and he became very listless and flaccid. At the age of 9 days, examination showed a very flaccid child who was "limp as a rag," and when he was hospitalized his hemoglobin was 66 per cent. White blood count was 15,900 with polymorphonuclears 47 per cent, lymphocytes 46 per cent, and eosinophils 7 per cent. On admission, urine showed 2 plus red cells and then two days later it was normal. Blood sugar was 91. Lumbar puncture showed 36 white cells. He was unable to suck well for about the first 5 days of life. On about the sixth day, a right facial weakness developed. Roentgenograms of the chest and stomach were normal. Subdural taps were negative. Polio type I virus was isolated from both the stools of the baby and mother when the baby was about 4 weeks old. On admission, the baby was put on a meat base formula and was unable to take milk until about the age of 6 months. When milk was given, he again became flaccid and weak and diarrhea developed.

CONCLUSION

During the neonatal period, milk allergy should always be considered in the diagnosis of infants with symptoms of colic, vomiting, diarrhea, nasal stuffiness, cough, and wheezing.

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DIFFERENTIATION of carcinoma in situ from histologic changes caused by pregnancy can be made only by repeated biopsies during the postpartum period, according to Jorge Campos, M.D., and Samuel Soihet, M.D., National Institute of Neoplastic Diseases, Lima, Peru.

Cervical biopsies were made for 200 pregnant women during labor or immediately after childbirth. The squamous epithelium of the ectocervix was increased in thickness in 30 per cent of patients. Hyperplasia of the basal cell layer was observed in 63 per cent and loss of cellular stratification in 10 per cent. In 15 per cent, nuclear size was increased. Nuclear hyperchromatism was noted in 10 per cent, atypical nuclei in 9 per cent, and decidual changes of the stroma in 10 per cent. In 5 per cent of patients, the changes were indistinguishable from those of carcinoma in situ.

Repeated examinations were made six and twelve weeks post partum. In all instances, alterations observed in the original biopsy specimen had regressed at subsequent examination. Therefore, the changes were believed to be due to pregnancy.

JORGE CAMPOS, and SAMUEL SOIHET: *Surg., Gynec. & Obst.* 102:427-432, 1956.

Treatment of Prognathism of the Mandible

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MANDIBULAR PROGNATHISM is encountered less frequently in this country now than in former years, probably because orthodontic therapy is more generally available. Such treatment can often rectify childhood dental malocclusions which, if not treated, may lead to severe degrees of protrusion of the lower jaw. However, mandibular prognathism still develops in some individuals to such a pronounced degree that surgical correction is advisable not only to restore normal facial contour but to assure proper function of the jaws as well.

An analysis of alleged etiologic conditions which cause this deformity reveals the fact that protrusions of the lower jaw usually are not the result of a single causative factor but of a succession of circumstances. Undoubtedly, heredity is in some way responsible for the majority of prognathic mandibles. However, probably most congenital, etiologic factors are related largely to disturbances in the normal eruption of the teeth and the subsequent growth of the mandible. A fact to remember is that conformation of the jaw bones alters continually until all permanent teeth erupt. Any condition which induces malposition of the teeth, such as supernumerary teeth, early loss of deciduous teeth, long retention of deciduous teeth, late eruption of permanent teeth, early loss of permanent teeth, or abnormalities of the tongue can occasionally initiate the occurrence of a protruded lower jaw.

Mandibular prognathism always is associated with malocclusion. When forward displacement is only slight, the teeth may interlock firmly and satisfactorily with the upper dental arch. However, when protrusion is pronounced, dental articulation may be badly affected or entirely lacking.

If the cusps of the teeth in a prognathic lower jaw interlock firmly with the cusps of the upper dental arch, the degree of mandibular protrusion is not increased after eruption of the permanent teeth. However, if malposition of the jaws is such that the teeth occlude poorly or not at all, anterior displacement of the mandible may continue indefinitely.

A rare cause of protrusion of the mandible is an unreduced, horizontal fracture of the maxilla which has been driven backward. When such a fracture occurs in childhood, the forward extension of the mandible may become increasingly pronounced as teeth erupt, until the lower jaw is in a state of prognathism.

TREATMENT

The Methods. Treatment of mandibular prognathism varies with the age of the patient. Children and youths should be treated only with orthodontic procedures. Early recognition of beginning mandibular protrusion in children together with undelayed orthodontic therapy often overcomes prognathism or may prevent the defect from increasing during the growing period of the mandible. When protrusion is so slight that the lower anterior teeth merely lie in a labial occlusion of the upper anterior teeth, surgical operations seem unwarranted.

Many surgical procedures have been devised to correct mandibular prognathism. None of these operations is completely satisfactory. Each possesses distinct advantages and disadvantages. Too often, the enthusiasm which some surgeons exhibit for a special technic completely overshadows the unsatisfactory aspects of the method. However, since every operation for this defect has beneficial as well as unfavorable attributes, the technic to be recommended is largely a matter of personal opinion and experience.

The methods, all of which require bilateral surgery, employed to correct mandibular prognathism are extremely varied but may be grouped as follows: (1) osteotomy at the neck of the condylar process; (2) complete removal of the condyle; (3) horizontal osteotomy of the ramus

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Read at the meeting of the American College of Surgeons, Milwaukee, February 27 to 29, 1956.

above the mandibular foramen; (4) ostectomy of a quadrilateral section of bone from the margin of the sigmoid notch associated with osteotomy at the neck of the condylar process; (5) vertical osteotomy of the ramus; and (6) ostectomy of the body of the mandible with or without preservation of the inferior alveolar nerve.

I prefer not to use the first 3 methods even though results are excellent in many cases and continuity of the lower dental arch is not disturbed. However, these procedures do result in an occasional open bite which may not become apparent until some time after the fragments of bone have healed. An open bite is extremely annoying to the patient because only the posterior molar teeth occlude. The patient has great difficulty in incising and masticating food. This complication is almost impossible to correct surgically. Usually, the simplest method of repair is to remove some of the posterior teeth so that those located anteriorly can articulate more satisfactorily. It is said that an open bite does not occur if fixation appliances are maintained for a sufficient length of time. However, in my experience, an open bite can occur occasionally in spite of any type of fixation. Moreover, if fixation of the jaws is continued too long, partial fibrous ankylosis may develop.

An even more serious complication than open bite can occur with osteotomy of the rami; I refer to bilateral nonunion of the fragments in which the lower jaw hangs down and is completely useless for incising and masticating food. Nonunion of saw cuts presents no trifling problem in repair and causes the patient great anxiety. While the afore-mentioned complications probably do not occur frequently, they are of sufficient gravity to dissuade me from using these 3 operations.

Smith and Robinson¹ have devised a plan for removing a quadrilateral section of bone from the sigmoid notch after which osteotomy is carried out at the neck of the condylar process. While this method has some advantages, it requires a large incision in the preauricular and temporal regions with reflection of soft tissues, and this technic seems somewhat difficult to execute. Then, too, the mandible cannot be forced back too far without impinging on other structures.

Caldwell and Letterman² have developed an interesting but rather intricate operation termed "vertical osteotomy." This procedure requires a large incision at the angle of the mandible with retraction of the mandibular branch of the facial nerve out of the operative field and reflection upward of periosteum, masseter muscle, and all

other soft tissues over the ramus. In addition, the attachment of the internal pterygoid muscle on the inner surface of the ramus is sharply severed, and the coronoid process is almost completely detached.

In my experience, bilateral resection of a segment of bone from the body of the mandible with preservation of the inferior alveolar nerve and artery is the simplest and most uniformly effective surgical means of correcting mandibular prognathism (figures 1 and 2). Furthermore, bilateral ostectomy of the body of the mandible does not disturb the temporomandibular joints or muscle attachments to the rami. It never produces an open bite or any degree of fibrous ankylosis. Since the body of the mandible is readily accessible for bilateral ostectomy, the segments of bone can be removed with comparative ease and great accuracy. Moreover, this procedure is particularly well adapted for mandibular protrusion associated with an open bite. Nonunion of the bony fragments, which almost never occurs, can be corrected easily by curetting away any fibrous tissue between the fragments and inserting a few cancellous bone chips from the crest of the ilium. As far as I can see, the only real disadvantage to this method is the necessity of shortening the lower dental arch, which seems of minor importance, since the patient is still able to incise and masticate food properly.

Harsha³ described a method of resection of a rhomboid portion of bone from the body of the mandible between the last molar tooth and the angle on each side. The mandibular nerve on each side was preserved intact. Although this procedure does maintain continuity of the lower dental arch, muscular attachments at the rami are disturbed, and the method seems too difficult to warrant general use.

Bilateral Ostectomy. In 1941, New and I⁴ described a technic for removing a segment of bone from each side of the body of the mandible without injuring the inferior alveolar nerve and artery. Many surgeons consider severance of the inferior alveolar nerve of little consequence, but I have found that some patients whose nerve has been cut complain of subsequent numbness; some never completely regain normal sensation in the lower lip. Resecting a segment of the lower jaw without injuring the inferior alveolar nerve is not difficult, and the effort is well rewarded by the additional comfort experienced by the patient.

This operation as originally described was performed in one sitting and first involved the extraction of all teeth in the two portions of

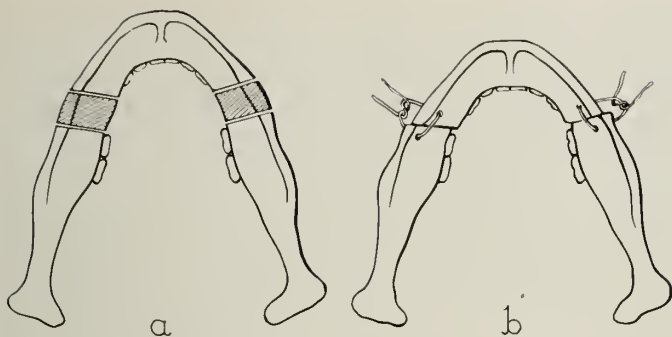


Fig. 1 (above). Bilateral ostectomy for correction of mandibular prognathism (mandible seen from below). (a). Shaded areas show segments of bone to be removed, the width of which has been determined preoperatively. (b) Segments have been removed. Anterior fragment moved backward. Three fragments brought into apposition and wired together.

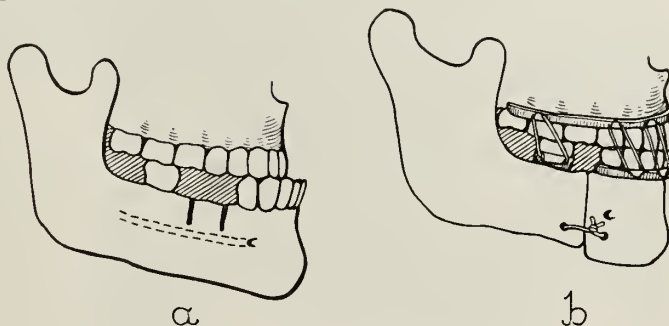


Fig. 2a (below). First stage of bilateral ostectomy for correction of mandibular prognathism. Teeth in each segment of bone to be removed are extracted and two cuts have been made with circular motor-driven saw from alveolar border down toward mandibular canal. (b). Second and third stages of bilateral ostectomy have been performed. Dental fixation appliances are in place. Segments of mandible have been removed. Fragments held together with heavy chromic catgut if teeth are present in lower fragments for fixation. If no tooth is present in posterior fragment, tantalum wire rather than catgut hold fragments in apposition.

bone to be removed. Actual resection of these bony segments was accomplished through an incision in the skin in each submaxillary region. Working in these wounds, which communicated directly and widely with the oral cavity, the two sections of bone were removed in a manner that will be described later in this paper. Although satisfactory results were achieved by this technique, the operation was long and tedious and produced a great deal of postoperative swelling and discomfort.

In 1948, Dingman⁵ changed our operation into a two-stage procedure which has definite advantages over the one-stage method.

As outlined by Dingman,⁵ the first stage consists of extracting all teeth in the two portions of bone which are eventually to be removed. In addition, a cross-cut, fissure, dental burr (I use a motor-driven circular saw) is employed to make two parallel cuts on each side of the mandible from the alveolar process down close to the mandibular canal. The bone between these cuts corresponds in width to the segment of bone to be resected. However, the bone intervening between these cuts is not removed during this first stage in order to prevent scar tissue from forming in any resultant spaces which would, in turn, prevent proper apposition of the bony fragments during the second stage of the operation. When the intra-oral wounds in which teeth have been extracted and saw cuts made have healed, in three or four weeks, the second stage is undertaken. This involves

resection of the segments of bone through incisions in the submaxillary regions as described by New and me⁴ in 1941. This two-stage procedure has much merit primarily because the wound in each submaxillary region through which the ostectomy is performed does not communicate with the mouth. Accordingly, postoperative swelling and pain are less, and the bony fragments tend to heal in a shorter time.

Three-stage Bilateral Ostectomy now Preferred. In recent years, I have found it advantageous to divide this operation into three stages. The first is as Dingman⁵ described. In the second stage, performed one month later, a segment of bone is removed from one side of the mandible. After another two or three days, the third stage is undertaken and a block of bone is resected from the opposite side of the mandible. Furthermore, both segments of bone are removed while the patient is under local anesthesia; that is, block anesthesia of the inferior alveolar nerve together with local infiltration of piperocaine hydrochloride (Metycaine Hydrochloride) at the operative site. The removal of segments of bone one side at a time with the aid of local anesthesia seems to lessen the swelling and discomfort and permits immediate intra-oral immobilization of the bony fragments during the third stage. Patients on whom I have performed this three-stage operation have had remarkably little postoperative discomfort. Moreover, this technic transforms a single prolonged and laborious operation into three short and simple tech-



Fig. 3. Pronounced mandibular protrusion corrected by bilateral ostectomy. Nasal plastic operation was performed to correct nasal deformity. (a). Preoperative front view. (b). Postoperative front view. (c). Preoperative lateral view. (d). Postoperative lateral view.

nics. Figure 3 pictures a patient before and after this operation. A description of this three-stage operation follows:

As a preliminary measure, good dental impressions of the upper and lower dental arches must be secured. From these impressions, plaster study models can be prepared. Only from such plaster casts can the size and location of the segments of bone to be removed be determined satisfactorily. The distance from the incisal edge of the upper anterior teeth to the incisal edge of the lower anterior teeth represents the degree of mandibular protrusion. Unless an associated posterior displacement of the superior maxilla is present, the width of the resected portion of bone on each side of the mandible should equal the degree of anterior displacement of the lower jaw. I usually prepare a little lead pattern which can be used as a guide during the operation; the width of this pattern represents the width of the segment of bone to be resected on each side. By further examination of the models, the surgeon can ascertain which teeth must be extracted because they are located in the areas from which bone will be removed. Whenever possible, I prefer to sacrifice the second bicuspid and first molar teeth, because a segment of bone removed from this region keeps the operative field at a safe distance from the mental foramen, and, thus, pos-

sible injury to the emerging mental nerve and vessels is avoided. Furthermore, usually one molar tooth is left intact for fixation of the posterior fragment. When, however, the lower molar teeth are absent, further extractions are unnecessary, because the segment of bone in the edentulous molar region can be resected. Formerly, I was of the opinion that each posterior fragment should have a molar tooth for fixation. However, in these days of antibiotics and better methods of direct fixation of bone, I do not believe a tooth in the posterior fragment is essential.

A protruded mandible associated with an open bite is not an unusual finding. Removal of a properly shaped section of bone from each side of the body of the lower jaw corrects both deformities simultaneously. In order to prepare lead patterns of suitable size and contour for a guide in such cases, I refer the reader to an article written by Schultz⁶ in 1927. He presented an admirable diagram by means of which a precise mathematical determination of such a pattern can be made.

Formerly, many surgeons believed that too large a segment of bone removed from each side of the mandible would leave insufficient space for the tongue when the anterior segment of bone was brought into apposition to the two posterior segments. However, such is not the case. The tongue drops back into the pharynx a trifle and becomes well accommodated to the smaller oral space.

Another item of much preoperative importance are roentgenograms, particularly lateral views, to determine the exact position of the mandibular canal in relation to the vertical dimension of the body of the mandible. In many instances, the course of the canal is not through the middle of the bone but downward within a few millimeters of the lower border of the jaw. If the surgeon is not aware of this anatomic variation before the operation, the saw cuts made upward from the lower border may sever the inferior alveolar nerve and vessels.

As soon as the width and shape of the segment of bone to be removed from each side of the body of the mandible has been determined by study of plaster models and roentgenograms, the first stage of this operation can be undertaken. Either thiopental sodium with oxygen administered through an intratracheal tube or bilateral block anesthesia of the inferior alveolar nerve can be employed. The teeth situated in the segments of bone to be removed are extracted. Subsequently, the mucoperiosteum is reflected buccally and lingually so that a circular

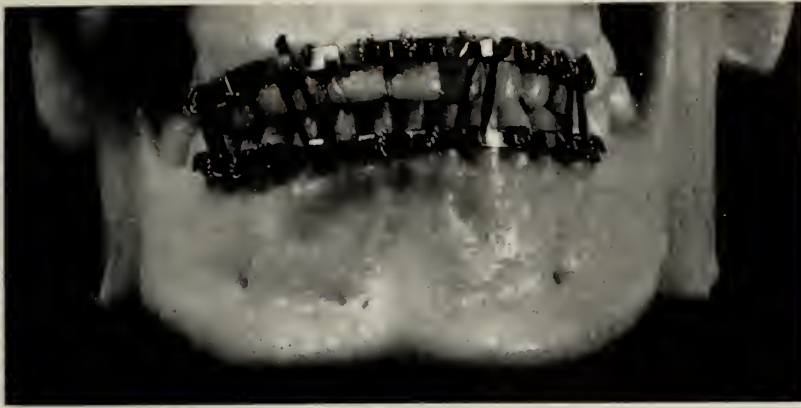
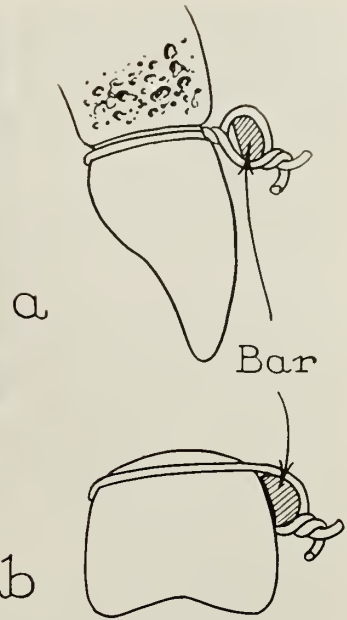


Fig. 4 (above). Hooked arch bars and intermaxillary elastic traction employed for fixation of fragments and maintenance of dental occlusion in cases of mandibular prognathism corrected by bilateral osteotomy. See text.

Fig. 5a and b (right). Method of ligating hooked arch bar to teeth as described in text.



motor-drive saw can be used to make the two cuts from the alveolar process down toward the mandibular canal. If teeth are already absent from the portion of bone to be removed, then the periosteum is merely incised and reflected so that the circular saw can be employed. The lead pattern, previously described, serves as a guide in making the saw cuts. It is of the utmost importance not to carry these cuts down far enough to sever the inferior alveolar nerve but to come short of the mandibular canal. After these saw cuts are made, the intra-oral wounds are sutured without removing the portion of bone intervening between the cuts. Usually, after one month, the wounds in the mouth are completely healed and the second and third stages can be undertaken.

The next steps involve resection of a segment of bone from each side of the mandible, which divides the lower jaw into three segments. When the anterior fragment is approximated with the two posterior fragments, the prognathic defect of the mandible is overcome.

Prior to removal of these, intra-oral appliances must be inserted and attached to the teeth for fixation of the bony fragments. Much of the success of any operation for the correction of mandibular protrusion depends on the effectiveness of the appliances used for immobilization. Formerly, I was of the opinion that cast silver splints should be used for fixation. However, these have definite disadvantages, and I have discarded them. Instead, I now believe that hooked arch bars with intermaxillary elastic bands provide the ideal method of immobiliza-

tion. Elastic traction tends to bring the teeth in the segments of the lower jaw into better occlusion with the upper dental arch and offers an excellent means of immobilization at the same time. To immobilize the fragments of bone in the lower jaw by elastic traction, I first apply a hooked arch bar to the upper dental arch (figure 4). I devised this hooked bar which is made of monel or stainless steel. It is inexpensive and is pliable enough so that finger pressure alone easily adapts it directly to the dental arch. Pliers and plaster models of the teeth are unnecessary in contouring the bar to the arch. This bar is wired to every tooth in the upper dental arch from the first molar teeth forward and ligated to the teeth by means of 26-gauge stainless steel wire. The ligature wire around each anterior tooth should be pushed over the cingulum and twisted once before it is twisted over the arch bar (figure 5a.) Wires hooked in this manner can never be pulled off by any amount of elastic traction. On the posterior teeth, the wire ligature around each tooth is twisted directly over the arch bar (figure 5b). In this way, the bar is permitted little vertical displacement even under strong intermaxillary elastic traction. If wires are twisted around posterior teeth before they are attached to the arch bar, the bar is allowed considerable vertical movement.

In a similar fashion, a small piece of a hooked arch bar is ligated by wires to the lower anterior teeth. If a molar tooth is left in either or both posterior fragments, I prefer to apply an orthodontic anchor clamp band to such a tooth. The

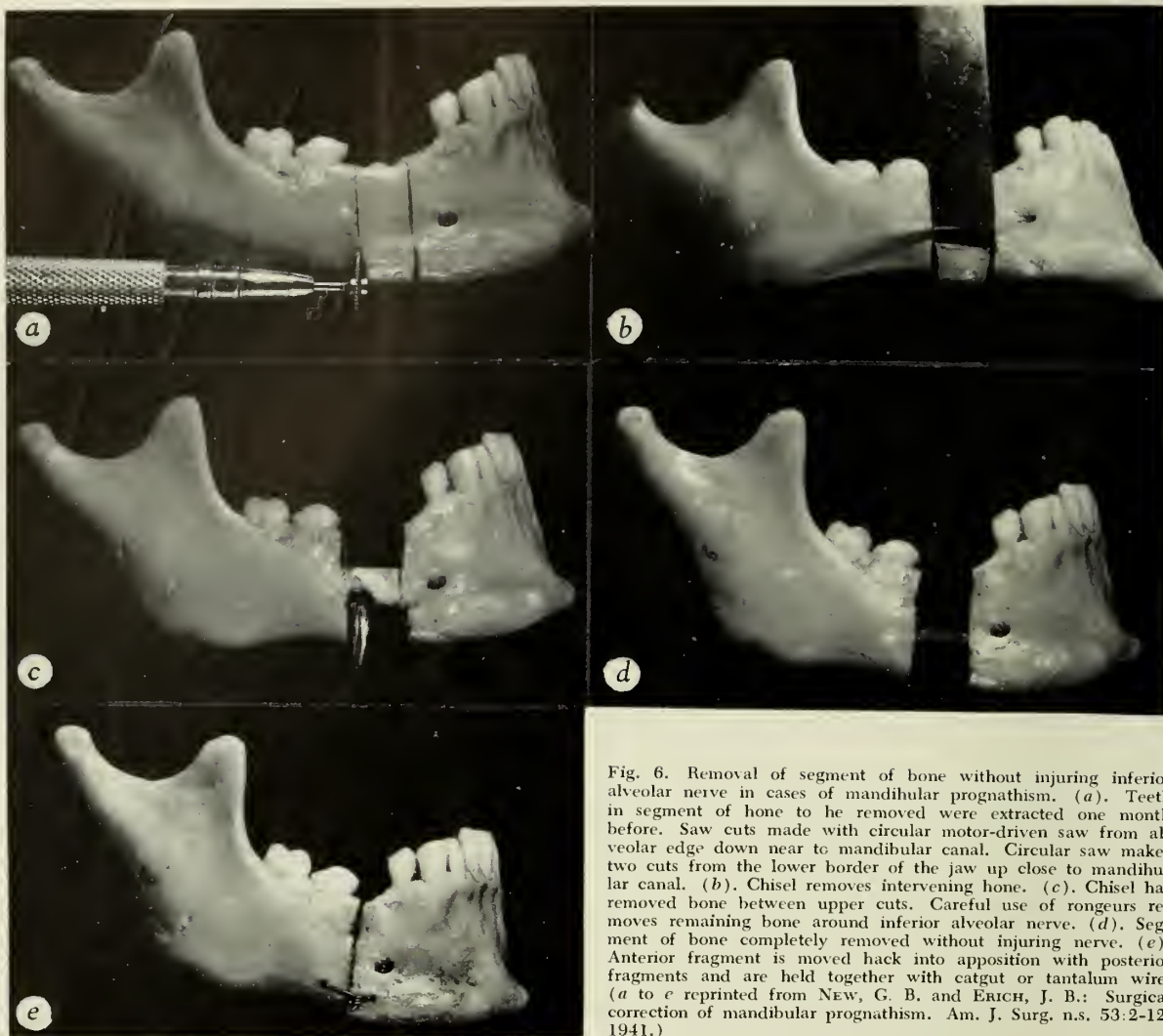


Fig. 6. Removal of segment of bone without injuring inferior alveolar nerve in cases of mandibular prognathism. (a). Teeth in segment of bone to be removed were extracted one month before. Saw cuts made with circular motor-driven saw from alveolar edge down near to mandibular canal. Circular saw makes two cuts from the lower border of the jaw up close to mandibular canal. (b). Chisel removes intervening bone. (c). Chisel has removed bone between upper cuts. Careful use of rongeurs removes remaining bone around inferior alveolar nerve. (d). Segment of bone completely removed without injuring nerve. (e). Anterior fragment is moved back into apposition with posterior fragments and are held together with catgut or tantalum wire. (a to e reprinted from NEW, G. B. and ERICH, J. B.: Surgical correction of mandibular prognathism. *Am. J. Surg.* n.s. 53:2-12, 1941.)

threaded bolt of the band serves as an excellent attachment for intermaxillary rubber bands. Such a band when properly clamped over the tooth cannot be displaced and is much more secure than a wire passed around the tooth.

After all the intra-oral appliances are in position, the second stage can be carried out. Although general anesthesia can be employed for this procedure, I prefer to use local anesthesia. The inferior dental nerve on the side of operation is blocked with a 2 per cent solution of Metycaine Hydrochloride. After the patient has been prepared and draped, a 1.5 per cent solution of Metycaine containing epinephrine (1 drop to a dram of Metycaine solution) is infiltrated into the tissues in the submaxillary region and over the buccal and lingual surfaces of the body of the mandible at the operative site. If the patient is at all apprehensive, sufficient Pentothal Sodium is administered intravenously to

produce analgesia during the period when the Metycaine is being infiltrated locally. This small amount of Pentothal Sodium relaxes the patient for the remainder of the operation. An incision 4 to 5 cm. is made in the submaxillary region about 2 cm. below the lower border of the mandible in order not to injure the mandibular branch of the facial nerve. Through this incision, the body of the mandible is exposed by blunt dissection. By use of blunt periosteal elevators, the periosteum is reflected away from the buccal and lingual surfaces and the upper edge of the bone to expose the full circumference of the lower jaw where the segment of bone is to be removed. After reflection of the periosteum, the saw cuts previously made through the alveolar process are readily visible. The entire wound should not communicate with the oral cavity. However, if a small tear is made in the overlying mucous membrane, no harm is done. By means

of the lead pattern and an indelible pencil, two parallel lines are drawn on the external surface of the mandible to connect with the saw cuts. The distance between these two lines represents the width of the segment of bone to be resected. A motor-driven circular saw is employed to cut along each of these pencil lines from the lower border of the mandible upward almost to the level of the mandibular canal (figure 6a). This saw should be used with caution and kept at a safe distance below the inferior alveolar nerve. A chisel is placed between the upper extremities of these two saw cuts (lower part of mandible) and by firm tapping with a mallet, the intervening portion of bone is removed (figure 6b). The chisel is then placed between the upper cuts in the jaw, and the piece of bone between these two saw cuts is detached. After these two pieces of bone are removed, only a small amount of bone remains about the nerve and vessels. By careful use of small rongeurs, this remnant of bone is gradually nibbled away and the nerve and vessels which are left intact are exposed (figures 6c and d). Finally, a curet is used to remove some of the cancellous bone surrounding the nerve and vessels in each segment. A cavity is thus created in which the exposed nerve and vessels can rest without injury when the anterior and posterior segments are brought into apposition. A small hole is drilled in each fragment near the lower border of the mandible about 1 cm. away from the cut edge. If a tooth is present in the posterior fragment for fixation, I prefer to use heavy chromic catgut through these two holes to approximate and hold the fragments together (figure 6e). However, if there is no tooth, I use a piece of heavy tantalum wire for this purpose. I believe that when the anterior and posterior fragments can be immobilized by interdental fixation, the bony fragments should be held together only with catgut which gradually absorbs. Occasionally, a wire used for this purpose causes trouble and requires removal months or years later. After the two fragments of bone have been tied together either with catgut or wire, the soft tissues overlying the bone are brought together and the incision in the skin is carefully sutured. In most instances,

no drain is necessary, and the patient experiences comparatively little postoperative pain and discomfort.

The third stage of the operation is performed two or three days later. This involves removal of the segment of bone on the opposite side of the mandible, and the technic is identical to that described in the second stage. I consider local anesthesia best at this time also. As soon as this stage is completed, the elastic bands can be applied to the intra-oral dental appliances which previously were attached to the teeth. By constant traction, these rubber bands tend to pull the lower teeth into satisfactory occlusion with the upper dental arch. These rubber bands can be left in place four to five weeks for immobilization of the fragments of the lower jaw. In my experience, the three fragments of the mandible usually heal satisfactorily in five weeks, after which the fixation appliances are no longer necessary. After removal of all intra-oral devices, the dental occlusion can often be greatly improved by grinding down cusps of teeth which interfere with good articulation.

COMMENT

In conclusion, I would like to say that I have obtained more satisfactory results with this three-stage technic in cases of mandibular protrusion than with any other surgical procedure I have employed. Its advantages have been described in detail, but I should like to emphasize the fact that this method is a rather simple procedure when compared to some of the formidable operations devised for this deformity. There are cases of mandibular protrusion in which the upper jaw is congenitally small or is displaced posteriorly by an old horizontal fracture of the maxilla. In such cases, the mandible should never be forced back so far that the lower anterior teeth are situated in lingual occlusion to the upper anterior teeth. On the contrary, the lower jaw should be moved back surgically merely to a position in keeping with normal facial contour. Subsequently, dental occlusion can be established by using orthodontic measures to advance the upper teeth, or, more commonly, with an artificial upper denture.

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Rehabilitation of the Multiple Sclerosis Patient

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SINCE MULTIPLE SCLEROSIS was first described by Charcot¹ at the end of the last century, this protean disease of the central nervous system has continued to perplex the medical profession. Many etiologies and therapies have been advanced, but the disease continues to remain the mystery crippler of young adults, lacking a definitive cure. The prevalence of the disease has been variously determined as approximately 35 to 64 per 100,000 population. Onset of symptoms occurs between the ages of 20 and 40 in two-thirds of the patients.² The average life expectancy after onset is almost 3 decades. Since the disease is known for its undulating course of exacerbations and remissions, a five-year appraisal of therapy has been estimated as the minimum period necessary to deduce reliable conclusions in evaluation of any therapy.³

In the approach to the total problem of rehabilitation of the multiple sclerosis patient, one of the most important facets is that of understanding the psychologic problems which arise in the patient. Braceland and Giffen⁴ in a study of some 200 patients were unable to determine any "typical MS personality pattern." Langworthy⁵ and Grinker and associates⁶ have suggested that multiple sclerosis patients are often individuals with exaggerated dependency needs and emotional immaturity. Early in the course of the disease the feeling of frustration appears, a feeling that external forces have brought about physical changes. All of us at some time or other have a feeling of omnipotency. This quality rapidly disappears in the multiple sclerosis patient after he has been faced with a series of exacerbations.

Indecision is ever present in the patient and is an expression of his dependency. Timidity frequently appears, which is also an expression of the infantile emotional level. He may be fearful of expressing his feelings about himself or

his attitudes concerning those who are caring for him for fear of rejection. Thus, the multiple sclerosis patient is not the cantankerous type of patient, and he rarely complains of the kind of care he is receiving.

The frustrations which normally evoke anger and hostility must be repressed in these patients in order to prevent the loss of love and affection which is sought from others. Psychologic studies reveal an intense desire in these patients to be close to the maternal figure. This desire is never gratified because of the aloofness of the mother in interpersonal relationships.⁶ Anxiety, which is present in many patients who are ill with long-term diseases, frequently is lacking in this illness. The tendency is to see the world through rose-colored glasses. The euphoria displayed by the patient has been interpreted by some to represent the patient's emotional mechanisms of escape from the reality of his physical condition.

In spite of all the emotional mechanisms present, Brickner and Simons,⁷ as well as many others, feel that there is no reason to believe that multiple sclerosis is a psychogenic disease and that the most that can be said is that emotional factors may be of importance in provoking attacks or abetting remissions. The extreme dependency needs of the individual patient must be recognized and with a friendly but firm manner he should be encouraged to accomplish his maximum rehabilitation goal. To fail to recognize the emotional problems present in the chronically ill patient leads to a premature defeat of any well-planned rehabilitation program.

A physician, when treating a multiple sclerosis patient, may become somewhat frustrated or resentful because, by the very nature of his art, he wants to heal, cure, or comfort his patients. With the multiple sclerosis patient, cure is lacking, and, if the physician does not recognize this factor of psychologic disappointment in himself, he may in rather subtle or unconscious ways project such a feeling on the patient.

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With respect to the active process of rehabilitation, the individual patient's needs must be adequately assessed by a careful neurologic examination. This includes a careful evaluation of cranial nerves, muscle strength, range of joint mobility, sensation, coordination, and reflexes.

The rehabilitation goals established for each individual patient vary according to the patient's needs. In addition to the medical and psychiatric evaluation, social and vocational evaluations are also secured.

During an acute exacerbation, an intensive exercise program should be avoided.⁸ This phase of the illness is best treated with medical management. However, during the acute phase, it is important to prevent deformities. All joints should be carried through a full range of motion several times a day. The patient should be positioned in bed so that deformities of the joints cannot occur. This may be accomplished by the use of a footboard to prevent shortening of the tendo achillis and the use of leg rolls to avoid an external rotation deformity of the hip joints. In the upper extremities, a rolled towel placed in the axilla may aid in preventing an adduction and internal rotation deformity of the shoulder. Splints may be necessary to prevent a flexor deformity of the wrists and fingers.

The patient who remains in bed for a period of time must be carefully watched lest decubiti develop. These pressure sores are frequently found in patients whose cutaneous sensations are altered, and whose bowel and bladder control are disturbed. Other factors contributing to the development of decubiti include the element of continued pressure on an area and the presence of deficient protein metabolism.

The nursing staff should be instructed how to prevent decubiti.⁹ Such measures include:

- a. Immediate cleansing of the skin after an episode of incontinence of urine or feces.
- b. Frequent bathing of the skin, massage, and the use of powder or ointment.
- c. Daily inspection for signs of pressure or excoriation.
- d. The use of sponge rubber mattresses or cushions on pressure points. Use of an air mattress devised to give intermittent pressure to areas in contact with it.
- e. Turning the patient every two hours.

An adequate protein intake must be maintained if the patient is in a phase of negative nitrogen balance. Early mobilization of the patient from the bed to a wheel chair or a standing table also aids in preventing decubiti.

After an excoriation or a decubitus is present, active measures must be instituted to prevent enlargement. If the ulcer is of a superficial nature, the area should be cleansed with hydrogen peroxide or soap. Heat should be applied daily with an ultraviolet or infrared lamp. Heat in-

creases the circulation and frequently brings forth a clear exudate. The exudate may be removed by blotting with a cotton pledget, and then the area should be allowed to dry in the air for one-half to one hour. After the drying period, the region is covered with a vaseline dressing and other soft dressings may be added which are kept in place with a large binder. Tape should not be used, for it may lead to further blistering and subsequent breakdown of the cutaneous area. Pressure should be kept off this area and this can be accomplished by having the patient sit or lie with other areas in the dependent position or with the use of the Stryker frame.

If the decubitus is of a deeper nature, other measures are needed. The ulcer should be carefully debrided of all necrotic tissue. The debridement should be carried out so that no overhanging edges of tissue are left. Next, the decubitus should be cleansed with hydrogen peroxide or soap for two or three days. Each day the wound should be carefully irrigated with a solution of 1 per cent acetic acid to which a 500-mg. ampule of tyrothricin has been added. This solution should be kept refrigerated. The 1 per cent acetic acid helps to control the pyocyanic infection, and tyrothricin aids in the control of other bacterial invaders. After irrigation, a dressing moistened with the solution should be placed in the ulcer. The ulcer should be left in this manner for forty-five minutes, after which the ulcer is blotted dry with a cotton pledget. Heat should then be applied with an ultraviolet or an infrared lamp, and this procedure is followed by the measures previously described. It must be remembered that healing by secondary intention is slow, and the scar tissue which replaces the ulcer is not as thick as normal skin.

Frequently, a decubitus ulcer is covered with a large heavy crusting area, and the physician may feel pleased to think that this area is healing. However, this is not the situation, for, underneath the heavy crust and at its edges, the decubitus continues to enlarge in all directions. This crust must be removed as soon as possible in order to institute the aforementioned therapy.

Many of the larger decubiti may be treated with a pedicle type of skin graft; however, in order to control the infection and prepare the ulcer for the graft, the treatment previously outlined should be administered prior to surgery.

Urinary complaints are frequent in patients with multiple sclerosis, secondary to the involvement of either the posterior columns or lateral columns of the spinal cord. These patients complain of an increased frequency of urination. Cystometrographic studies reported by Nesbit

and Baum¹⁰ reveal numerous uninhibited contractions resulting in involuntary emptying of the bladder. The patient should be placed on a regime of 50 mg. of Banthine four times a day which aids in returning the bladder to a near-normal voiding action.

Severe spasticity may be one of the most perplexing symptoms encountered in the multiple sclerosis patient and is due to the involvement of the upper motor neuron. Spasticity of a mild degree ordinarily causes relatively little trouble. Several physical therapeutic procedures have been recommended for the relief of spasticity, such as massage, heat, and electrical stimulation. If the spasticity is alleviated somewhat by these measures, it tends to return rapidly after the therapeutic measures are discontinued. Some patients may benefit by voluntary relaxation as is employed in the progressive relaxation technique of Jacobson.¹¹ In another method, heavy resistive exercises are applied to the uninvolved musculature for twenty to thirty minutes. After the resistive exercises, spasticity of the involved extremities may decrease, at which time these extremities may be exercised to strengthen the muscles. Gordon¹² reports that gains appear to be held if the patient continues actively with such a program. This approach may benefit the spasticity and at the same time the weakness of the involved extremities. Braces are used for the spastic limb only when they are expected to increase the patient's skills. Thus, a severe foot drop secondary to spasticity which is refractory to other measures should have an ankle brace only if the patient's gait is aided by such a brace. A long leg brace with a pelvic band may be helpful for ambulation in cases of spastic paralysis of the lower extremities with subsequent internal rotation at the hip and an unstable hip joint. Ambulation of the patient with severe clonus of the leg may be benefited by a long leg brace with a knee lock.

Several medications, such as mephenesin (Tolserol), curare, Prostigmin, and Prostigmin with Tridione, have been used without alleviating spasticity for sufficient periods of time. Recently, this condition was reported to be benefited by chlorpromazine.¹³ However, this medication has not as yet received adequate evaluation. Drugs such as Equanil and Flexin also require further clinical evaluation.

The extreme form of spasticity is seen in patients with a mass flexion reflex which is precipitated by minor sensory stimulation. With this condition, flexion of the hip and knee, and dorsiflexion of the ankle occurs. Flexion at the hips may be so severe that the knees are brought up

underneath the chin. In a mass reflex, the patient may be thrown from his bed. If the position of flexion is maintained over a long period of time, deforming contractures result which prevent ambulation with the use of braces and also prevent sitting. Physical therapy increases the frequency and severity of mass reflexes. The treatment of choice in the past has been an anterior rhizotomy usually from D-11 to S-4. This operation should spare the second sacral segment which is necessary for bladder re-education. Before considering anterior rhizotomy, attention should be paid to the metabolic state of the patient, complicating infections, anemia, hypoproteinemia, and urinary calculi.¹⁴ Berlin¹⁵ reported pronounced reduction of the mass flexor reflex and abolishment of clonus and deep tendon reflexes in 6 paraplegic patients after the injection of 3 cc. of 2 per cent mephenesin into the subarachnoid space in the lumbar region. Simultaneous reduction of voluntary motor functions of the lower extremities also occurred. The reflex motor phenomenon and voluntary motility of the lower extremities returned in approximately ninety to one hundred and twenty minutes after injection of mephenesin. A residual depression of these functions lasted for many days after the injection. Because of the production of adhesive arachnoiditis after the intrathecal injection, further evaluation of this therapy is needed.

Muscle weakness is a common occurrence in patients with multiple sclerosis. The disease does not involve the peripheral nerve nor does it afflict the anterior horn cells. However, because these patients are inactive, a superimposed atrophy of disuse often occurs. A specific exercise program is necessary to restore function to atrophic muscles. The type of exercise must, of necessity, vary with the muscle strength that remains. Passive and active exercises may be helpful in maintaining muscle tone. However, in order to increase muscle activity to maximum function, resistive exercises are required. These can be utilized only if sufficient muscle strength is present. Formerly, it was thought that the multiple sclerosis patient should avoid fatigue, because overwork had been observed to precipitate an exacerbation of the disease. However, several clinics¹⁶ have found that heavy exercise programs under adequate supervision have not injured these patients. Whenever possible, the patient should be taught exercises that he can perform by himself. The use of overhead slings is beneficial in exercising the upper or the lower extremities, the opposite extremity serving as resistance to the moving extremity. The use of the shoulder wheel helps to strengthen the shoul-

der girdle or to maintain a full range of motion of this joint. The bicycle exercise unit or the ankle exercise unit may be used as a method of resistive exercise for the lower extremities.

Patients whose greatest involvement is of a spinal nature may be likened to the paraplegic patient in that they may have adequate or normal activity of the upper extremities but limited activity of the lower extremities. These patients learn to get about very readily in a wheel chair and should be taught the independent activity of getting in and out of the wheel chair, to and from the bed, or to and from the floor.

Patients with sufficient muscle strength in the upper extremities may be taught to walk with the aid of crutches. Prior to this training, simple procedures such as muscle strengthening, are instituted. These exercises may be carried on in bed, at which time heavy sand bags may be used for increasing strength of the extensors of the forearms. Pushups also accomplish this purpose. For strengthening the grip, a rubber ball or a spring device may be used. In the wheel chair, the patient can increase strength in his upper extremities by raising his body as he presses downward on the arm-rests with his hands and straightens his elbows. On the mat, pushups are used in addition to a weighted bar bell.

The patient should gain confidence in standing preparatory to walking, using parallel bars in which he learns how to balance himself and learns proper hand and foot placement for crutch walking. As strength and confidence are gained, he is taught the two-point, four-point, swing-to, or swing-through type of gait. He then graduates to crutches or a similar type of training.

The incoordination which develops in a multiple sclerosis patient is secondary to cerebellar dysfunction. It is one of the most perplexing problems in therapy. Thus far, no adequate medical therapy has been of value. In order to improve the patient's coordination, Fraenkel's ex-

ercises¹¹ may be utilized. While in the supine position, such gross activities as flexion and extension of the knees are performed and then the heel is permitted to slide down on the bed. The patient is instructed to place the heel of one lower extremity on definite points of the opposite lower extremity or to touch certain objects above the bed with a great toe. Exercises may be performed with the aid of a mirror at first but, as these exercises are mastered, they should be performed with the eyes closed. In a standing position, the patient is taught to stand with both feet together with his eyes opened and then closed. He is also instructed to stand with one foot in front of the other. Further exercises include walking on the toes, the heels, and standing first on one foot and then on the other.

Coordination exercises for the upper extremities vary from such activities as placing the finger on the nose to more skillful actions, such as buttoning buttons. The Montessori board, equipped with such objects as zippers, laces, buttons, and belt buckles, helps to improve hand skills and increase coordination.

The active rehabilitation program for the multiple sclerosis patient should include occupational therapy. This treatment may be of a diversional or therapeutic nature directed toward improvement of muscle strength or coordination.

Vocational guidance is very helpful and should be obtained early in the illness. The patient's own skills and previous education are an aid in directing his vocational program. This training should be aimed toward maximum use of his capacities and, if possible, toward vocations that can be performed in a sitting position.

The objective of such a program is to teach the patient how to live with his disabilities and how to use his residual capacities to the utmost. Thus, he may become productive or independent.

Aided by a grant from the National Foundation for Infantile Paralysis.

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Precancerous Lesions of the Rectum and Colon

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ACCORDING TO FIGURES released by the Federal Security Agency, carcinoma of the colon and rectum accounted for 33,000 deaths in the United States in 1947. Fairly accurate estimates indicate that approximately 12 per cent of all malignant tumors and about 80 per cent of all cancers of the entire alimentary tract, exclusive of the stomach, originate in the anus, rectum, or sigmoid colon. Also, cancer of the rectum and sigmoid ranks fourth among those affecting the human body, preceded only by carcinoma of the cervix, breast, and, possibly, of the stomach and lungs. If we realize that more extensive and radical operations for carcinoma of the rectum and colon are not apt to significantly lower the mortality from these tumors, we should attempt either to diagnose cancer at an earlier stage or to recognize and eradicate precancerous lesions before carcinomatous degeneration occurs. Only in this way can the death rate from carcinoma of the rectum and colon be significantly lowered in the next few years. This discussion will be limited to the more common precancerous lesions of the colon and rectum.

By far the most common precancerous lesion of the colon and rectum is the adenomatous polyp. Other lesions which are generally considered to be precancerous are congenital familial polyposis and the villous adenoma, which is a much more complex tumor than the adenomatous polyp. Chronic unrelenting ulcerative colitis is fairly well agreed to be one of the common conditions which are in some way responsible for carcinomatous changes in the colonic mucosa.

The incidence of adenomatous polyps in the colon and rectum is considerably higher than seems apparent from textbook information. Helwig, in a very interesting review, states that 1 person in 5 who reaches the age of 60 has an

adenoma of the large bowel with a slight preponderance in males. His figures were obtained from 1,460 consecutive autopsies which were exclusive of cases of familial multiple polyposis. In the first three decades of life, the average incidence of adenomata is approximately 3 per cent. With the beginning of the fourth decade, the number of polyps gradually increase with the maximum being reached in the eighth decade, when 24 per cent were found to have 1 or more adenomas of the large intestine. The overall incidence in Helwig's series was 9.5 per cent. In a series of 1,800 autopsies, Swinton reported adenomas of the colon in 7 per cent of cases. Of these, 42 per cent had multiple polyps. Adenomas were found most frequently in the rectum and sigmoid colon.

Approximately 70 per cent of all adenomatous polyps are within the reach of the 25 cm. sigmoidoscope. Of all malignancies of the colon, 70 per cent also occur within the same segment of bowel. The close correlation of these percentages is in all probability more than coincidental. Warren and Swinton demonstrated in a good series of cases that 14 per cent of carcinomas of the colon developed from formerly benign polyps. This percentage probably would be much higher if it were possible to recognize whether a benign polyp existed earlier and carcinomatous degeneration subsequently occurred. Since adenomatous polyps can and often do undergo malignant degeneration, all adenomatous polyps or polypoid lesions of the rectum and colon should, of course, be removed. Whenever possible the entire lesion should be removed and given to the pathologist for complete examination to determine whether areas of malignant degeneration are present and whether the stalk of the polyp has been invaded. If invasion has occurred, this polyp should, in our opinion, be treated as a carcinoma with adequate resection

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Presented at the joint meeting of the North and South Dakota State Medical Associations at Aberdeen, South Dakota, June 6, 1956.

of the involved segment of bowel and its lymphatic drainage. In the so-called polyp with carcinoma in situ in which malignant areas appear on the periphery of the polyp and the stroma is not invaded, the question of whether radical resection should be performed remains open at the moment. Scarborough has reported lymph node metastases with no evidence of invasion of the stalk. In our opinion, if the polyp is serially sectioned and there is no evidence of invasion of the stalk, colotomy and polypectomy is adequate treatment for this type of lesion, particularly in the pedunculated polyp. As stated before, 70 per cent of adenomatous polyps are in the lower 25 cm. of the colon and rectum, and obviously thorough and adequate proctoscopic and sigmoidoscopic examination will detect a large percentage of adenomatous lesions. Above the 25 cm. level, the roentgenologist must of necessity be depended upon for examination of the colon. However, with new and improved air-contrast technics, I do not believe it is unreasonable to expect the roentgenologist to demonstrate polypoid tumor lesions of the colon as small as 1 cm. in diameter. We have had demonstrated and have surgically removed many polyps as small as 5 mm. in diameter. The bowel must be thoroughly and adequately prepared in order to demonstrate these small lesions. A roentgen study of a colon poorly prepared is in our opinion worse than no roentgenogram at all, because it lulls the patient and the physician into a sense of false security. If proctoscopic examination reveals blood or bloody mucus above the lower rectum, the proctoscopist should insist on further studies as this is the cardinal sign of polyps above the 25 cm. level.

Exploratory laparotomy should never be done for small polyps of the colon on the basis of a single roentgen study. We insist that the study be repeated a few days after the first, and, if the same lesion appears in the same area, we feel justified in exploring the patient and removing the polyp regardless of its size. The physician who, in the face of a small polypoid defect in the colon, advises the patient to return in three or six months for a repeat roentgenogram to see whether the tumor has grown assumes a very grave responsibility. Certainly, all carcinomas do not begin as adenomatous polyps, and, from a roentgenogram, it is virtually impossible to tell whether a small lesion is benign or malignant. It must be examined microscopically to establish its histology.

The so-called villous tumor, villous papilloma, or villous polyp is different from the adenomatous polyp in that it occurs most frequently in

the rectum and lower rectosigmoid. Its histologic structure is entirely different. Increase in the number of goblet cells in the epithelial portion of the tumor is tremendous. The growths are vascular but appear rather grayish pink in color and usually are paler than the mucous membrane in contrast to the typical adenomatous polyp which is usually a raspberry color. Histologically, the change from normal mucosa to tumor is rather abrupt in the typical adenomatous polyp, whereas the villous tumor has a zone of definite microscopic mucosal change about the gross tumor. This zone often involves an area of 1 to 1.5 cm. beyond the gross tumor. This was beautifully demonstrated in a review of villous tumors presented by Swinton in 1955. Villous tumors often reach enormous size without undergoing malignant degeneration. However, sometimes malignant degeneration does develop, and the tumor is usually of the gelatinous type and very malignant. Rankin reported that approximately 20 per cent of villous tumors undergo malignant degeneration. However, in our experience, this percentage seems somewhat high. In 523 cases of carcinoma of the terminal colon, Dixon reported 5 cases of the papillary type, and none of these patients survived three years after radical resection. It is of even greater importance to present the entire villous tumor to the pathologist for careful sectioning to detect areas of malignant degeneration than with the typical adenomatous polyp. Small bite biopsies from multiple areas of the tumor frequently do not pick up malignant tissue, whereas, careful examination of the entire tumor for hardened areas often reveals a small area of malignant degeneration. If such degeneration is found, the treatment is the same as for any carcinoma. Since the greatest percentage of these tumors occur in the rectum and lower rectosigmoid, they are usually easily accessible, and our practice has been to remove the entire tumor as a total biopsy and close the defect in the mucosa with a running suture of chromic catgut. A tumor situated rather high in the rectum can be exposed from below prior to excision by performing a posterior proctotomy using the Harrison-Cripps technic. An attempt is made to take approximately 1 cm. of normal appearing mucosa beyond the limits of the visible tumor, and if no malignant areas are present, these patients should be examined sigmoidoscopically at frequent intervals. Often there are small recurrences which, no doubt, represent the remnants of the mucosal changes demonstrated by Swinton. These can be thoroughly fulgurated in the office, and, with this technic, we have had no

reason to change our approach to the problem of the benign villous tumor. We feel that total biopsy has real advantage over the multiple biopsy technic and later fulguration or local excision if the tumor is benign, inasmuch as small areas of malignant degeneration are demonstrated which might be missed by multiple biopsy. If examination reveals that the entire tumor is benign, the patient undergoes only one surgical procedure and can be discharged rather quickly from the hospital after the excision biopsy.

It seems superfluous to point out that congenital familial polyposis is a precancerous lesion, inasmuch as it is common knowledge that in nearly everyone who is subject to this hereditary disease, a carcinoma of the rectum or colon has developed before the age of 40. Suffice it to say that if a diagnosis of congenital familial polyposis is made, every member of the family should be thoroughly examined. The accepted treatment of this disease is to remove the entire colon down to a point where the entire rectal stump can be examined with a sigmoidoscope. If all the polyps can be fulgurated in the rectal stump, an anastomosis between the terminal ileum and the distal rectal stump can be carried out. If the polypoid pathology in the rectum is so extensive that fulguration cannot destroy all the polyps, total colectomy and permanent ileostomy is the treatment of choice.

I should like to say a word about the incidence of carcinoma in patients with ulcerative colitis. Well established is the fact that polypoid disease and subsequent carcinoma are among the commonest complications of chronic ulcerative colitis. It has been variously estimated that in about 10 to 15 per cent of all patients with chronic ulcerative colitis, polyps or polypoid lesions subsequently develop, while only 3 to 5 per cent die as a result of carcinoma of the colon. A definite percentage incidence of carcinoma of the colon among patients with ulcerative colitis is extremely difficult to establish, inasmuch as the published figures are usually surgical series and do not represent a true incidence of carcinoma in this disease. The patient with chronic disease without indications for surgery

is often not included in a series reporting on the incidence of carcinoma of the colon in ulcerative colitis. Suffice it to say that pseudopolypoid or frank polypoid pathology in chronic ulcerative colitis is sufficient indication for total colectomy. All available evidence indicates that the incidence of carcinoma of the colon among patients with chronic unremitting ulcerative colitis is several times that of the general population.

SUMMARY

1. Adenomatous polyps of the rectum and sigmoid colon are known to be precancerous lesions. Deserving emphasis is the fact that approximately 10 per cent of the adult population past the age of 40 harbor 1 or more polypoid tumors within their rectum and colon.

2. More radical and extensive operations for resection of frank carcinoma of the rectum and colon with or without metastases is not apt to increase significantly our survival rates from cancer of these organs. The incidence of carcinoma of the rectum and colon over a period of years could probably be significantly decreased by diligent search, early recognition, and prompt treatment of precancerous lesions of the colon.

3. We should like to again stress the importance of total excision and thorough microscopic examination of any polypoid tumor which appears benign, to determine whether or not areas of malignant degeneration exist.

4. The so-called villous tumor or villous papilloma which occurs most frequently in the rectum and rectosigmoid is different than the adenomatous polyp. So-called local recurrences are not indications for radical surgery.

5. All patients with congenital multiple polyposis should have either subtotal colectomy with ileoproctostomy or total colectomy, depending on whether or not fulguration can clear the rectal segment of polyps.

6. Total colectomy and permanent ileostomy should be seriously considered for patients with longstanding intractable ulcerative colitis in whom polypoid disease has developed if the incidence of carcinoma complicating this particular disease entity is to be significantly lowered.

Transactions of the North Dakota State Medical Association

Sixty-Ninth Annual Meeting

Aberdeen, South Dakota, June 2, 3, 4, 5, and 6, 1956

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J. C. FAWCETT, Chairman
A. R. GILSDORF, Vice-Chairman
R. D. NIERLING, Secretary

COUNCIL: Executive Committee

J. C. FAWCETT
R. D. NIERLING
R. B. RADL

BOARD OF MEDICAL EXAMINERS

Terms expiring 1956

JOSEPH SORKNESS	Jamestown
O. W. JOHNSON	Rugby
H. L. REICHERT	Dickinson

Terms expiring 1957

J. C. FAWCETT	Devils Lake
R. O. GOEHL	Grand Forks
W. A. WRIGHT	Williston

Terms expiring 1958

C. A. ARNESON	Bismarck
W. E. G. LANCASTER	Fargo
V. J. FISCHER	Minot

Member: Medical Center Advisory Council

P. H. WOUTAT	Grand Forks
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Members: State Health Council

O. W. JOHNSON	Rugby
R. F. GILLILAND	Dickinson

HOUSE OF DELEGATES

DEVILS LAKE DISTRICT

G. W. TOOMEY	Devils Lake
WILLIAM FOX	Rugby
E. J. SCHWINGHAMER, alternate	New Rockford
R. M. FAWCETT, alternate	Devils Lake

FIRST DISTRICT

C. V. BATEMAN	Wahpeton
G. C. FOSTER	Fargo
A. K. LEWIS	Lisbon
F. A. DE CESARE	Fargo
J. F. SCHNEIDER	Fargo
L. E. WOLD	Fargo
D. G. JAEHNING, alternate	Wahpeton
H. W. HAWN, alternate	Fargo

D. W. NAGLE, alternate	Enderlin
A. C. FORTNEY, alternate	Fargo
F. M. MELTON, alternate	Fargo
C. M. HUNTER, alternate	Fargo

GRAND FORKS DISTRICT

R. C. PAINTER	Grand Forks
BRUCE BOYNTON	Grafton
A. C. KOHLMEYER	Larimore
F. A. HILL	Grand Forks
J. A. SANDMEYER	Grand Forks
W. C. DAILEY, alternate	Grand Forks
R. E. MAHOWALD, alternate	Grand Forks

NORTHWEST DISTRICT

G. M. HART	Minot
A. F. HAMMARGREN	Harvey
FRED ERENFELD	Minot
V. J. FISCHER	Minot
A. R. SORENSON	Minot
L. H. KERMOTT, JR., alternate	Minot
W. B. HUNTLEY, alternate	Minot
J. L. DEVINE, JR., alternate	Minot
O. S. UTHUS, alternate	Minot

SHEYENNE VALLEY DISTRICT

GUNDER CHRISTIANSON	Valley City
N. A. MACDONALD, alternate	Valley City

SIXTH DISTRICT

R. W. HENDERSON	Bismarck
CARL BAUMGARTNER	Bismarck
M. S. JACOBSON	Elgin
C. H. PETERS	Bismarck
O. C. GAEBE	New Salem

SOUTHWESTERN DISTRICT

R. F. GILLILAND	Dickinson
KEITH FOSTER	Dickinson
JULIAN TOSKY, alternate	Hebron
ROBERT GOULDING, alternate	Bowman

STUTSMAN DISTRICT

T. E. PEDERSON	Jamestown
JOHN VAN DER LINDE	Jamestown
R. O. SAXVIK, alternate	Jamestown
JOHN ELSWORTH, alternate	Jamestown

TRAIL-STEELE DISTRICT

R. W. McLEAN	Hillsboro
H. A. LA FLEUR, alternate	Mayville

KOTANA DISTRICT

J. D. CRAVEN	Williston
A. K. JOHNSON, alternate	Williston

COMMITTEES: HOUSE OF DELEGATES

Sixty-Ninth Annual Meeting

STANDING COMMITTEES

Committee on Medical Education:

H. M. BERG, chairman	Bismarck
T. E. PEDERSON	Jamestown
T. H. HARWOOD	Grand Forks
W. A. WRIGHT	Williston
R. F. GILLILAND	Dickinson
L. H. KERMOTT, JR.	Minot
J. H. MAHONEY	Devils Lake
P. O. DAHL	Bismarck
F. D. NAEGELI	Minot
W. E. G. LANCASTER	Fargo
R. E. LEIGH	Grand Forks
ROBERT PAINTER	Grand Forks

Committee on Necrology and Medical History:

E. H. BOERTH, chairman	Bismarck
A. R. SORENSON	Minot
H. E. FRENCH	Grand Forks
F. L. WICKS	Valley City
A. D. McCANNEL	Minot
R. E. LEIGH	Grand Forks

Committee on Legislation:

O. W. JOHNSON, chairman	Rugby
H. L. REICHERT	Dickinson
J. N. ELSWORTH	Jamestown
C. A. ARNESON	Bismarck
KEITH VANDERGON	Portland
GUNDER CHRISTIANSON	Valley City
W. A. WRIGHT	Williston
W. E. G. LANCASTER	Fargo
ROBERT TUDOR	Bismarck
L. F. PINE	Devils Lake
P. H. WOUTAT	Grand Forks
F. R. ERENFELD	Minot

Committee on Public Relations:

JOHN CARTWRIGHT, chairman	Bismarck
AMOS GILSDORF	Dickinson
L. F. PINE	Devils Lake
R. O. GOEHL	Grand Forks
W. H. GILSDORF	Valley City
JOSEPH CRAVEN	Williston
V. J. FISCHER	Minot
KEITH VANDERGON	Portland
RALPH MAHOWALD	Grand Forks
T. E. PEDERSON	Jamestown

Committee on Official Publication:

G. W. TOOMEY, chairman	Devils Lake
O. A. SEDLAK	Fargo
JOSEPH SORKNESS	Jamestown

Committee on Geriatrics and Rehabilitation:

T. H. HARWOOD, chairman	Grand Forks
R. O. SAXVIK	Jamestown
S. M. CHASTEN	Grand Forks
G. C. THORGRIMSEN	Grand Forks
C. W. SCHOREGGE	Bismarck
PAUL JOHNSON	Bismarck
JOSEPH CRAVEN	Williston
R. G. ROGERS	Fargo
NEIL MACDONALD	Valley City

Committee on Public Health:

T. Q. BENSON, chairman	Grand Forks
C. O. McPHAIL	Crosby
C. C. SMITH	Mandan
D. H. LAWRENCE	Fargo
O. W. JOHNSON	Rugby
FRANK WHEELON	Minot
A. F. HAMMARGREN	Harvey
PERCY OWENS	Bismarck
G. L. LOEB	San Haven
R. F. GILLILAND	Dickinson

Committee on Cancer:

C. M. LUND, chairman	Williston
G. W. HUNTER	Fargo
L. W. LARSON	Bismarck
E. J. LARSON	Jamestown
R. W. RODGERS	Dickinson
W. E. G. LANCASTER	Fargo
K. E. FRITZELL	Grand Forks
O. W. JOHNSON	Rugby

Committee on Medical Economics:

TED KELLER, chairman	Rugby
V. J. FISCHER	Minot
W. A. WRIGHT	Williston
E. J. LARSON	Jamestown
O. A. SEDLAK	Fargo
C. H. PETERS	Bismarck
R. W. RODGERS	Dickinson
A. C. KOHLMAYER	Larimore

Sub-committee on Veterans Medical Service:

A. C. FORTNEY, chairman	Fargo
R. W. HENDERSON	Bismarck
AMOS GILSDORF	Dickinson
PERRY TRIGGS	Fargo

Committee on Prepayment Medical Care:

C. H. PETERS, chairman	Bismarck
T. E. PEDERSON	Jamestown
V. J. FISCHER	Minot
ELLIS OSTER	Ellendale
FRANK DE CESARE	Fargo
W. E. G. LANCASTER	Fargo
FRANK HILL	Grand Forks
CHARLES PORTER	Grand Forks

Committee on Rural Health:

K. G. VANDERGON, chairman	Portland
STEPHEN BACHELLER	Enderlin
CLARENCE MARTIN	Kensal
M. S. JACOBSON	Elgin
W. R. FOX	Rugby
L. T. LONGMIRE	Devils Lake

Committee on Nursing Education:

C. A. ARNESON, chairman	Bismarck
LLOYD RALSTON	Grand Forks
G. N. VIGELAND	Rugby
KEITH VANDERGON	Portland
AMOS GILSDORF	Dickinson
T. E. PEDERSON	Jamestown
ROBERT FAWCETT	Devils Lake
R. O. SAXVIK	Jamestown

Committee on Maternal and Child Welfare:

R. E. LUCY, chairman	Jamestown
M. M. HEFFRON	Bismarck
JOHN II. MOORE	Grand Forks
L. G. PRAY	Fargo
JOHN GILLAM	Fargo
R. T. GAMMELL	Kenmare

Committee on Crippled Children:

L. G. PRAY, chairman	Fargo
C. W. HOGAN	Jamestown
A. E. CULMER, JR.	Grand Forks
PAUL JOHNSON	Bismarck
D. T. LINDSAY	Fargo
H. J. FORTIN	Fargo
B. A. MAZUR	Fargo
L. B. SILVERMAN	Grand Forks
C. G. JOHNSON	Rugby
J. C. SWANSON	Fargo

SPECIAL COMMITTEES

Committee on Displaced Physicians:

C. J. GLASPEL, chairman	Grafton
J. C. FAWCETT	Devils Lake
JOSEPH SORKNESS	Jamestown
O. W. JOHNSON	Rugby
W. A. WRIGHT	Williston

Committee on Emergency Medical Service:

ROBERT NUSSLE, chairman	Bismarck
RALPH MAHOWALD	Grand Forks
C. G. JOHNSON	Rugby
J. L. DEVINE, JR.	Minot
ROBERT GILLILAND	Dickinson
J. D. LE MAR	Fargo
R. D. NIERLING	Jamestown
R. O. SAXVIK	Jamestown
C. M. LUND	Williston

Committee on American Medical Education Foundation:

W. E. G. LANCASTER, chairman	Fargo
O. W. JOHNSON	Rugby
K. G. VANDERGON	Portland
E. G. VINJE	Hazen
W. A. WRIGHT	Williston
GUNDER CHRISTIANSON	Valley City
KEITH FOSTER	Dickinson
RALPH LEIGH	Grand Forks
L. W. LARSON	Bismarck
J. W. JANSONIUS	Jamestown

Committee on Mental Health:

JOHN FREEMAN, chairman	Jamestown
L. A. CHRISTOFERSON	Fargo
R. D. NIERLING	Jamestown
M. T. CARTWRIGHT	Bismarck
J. J. GEIB	Moorhead, Minnesota
L. H. FREDRICKS	Bismarck
G. D. ICENOGLU	Bismarck
R. C. TURNER	Grand Forks
L. H. KERMOTT, JR.	Minot
L. B. FROKE	Grand Forks

Committee on Diabetes:

E. A. HAUNZ, chairman	Grand Forks
A. K. JOHNSON	Williston
R. M. FAWCETT	Devils Lake
H. A. LA FLEUR	Mayville
P. ROY GREGWARE	Bismarck
T. E. PEDERSON	Jamestown
MARTIN HOCHHAUSER	Garrison
DONALD BARNARD	Fargo
W. H. GILSDORF	Valley City
R. F. GILLILAND	Dickinson

Committee on Constitution and Bylaws:

R. B. RADL, chairman	Bismarck
G. A. DODDS	Fargo
E. H. BOERTH	Bismarck

Committee on Scientific Program:

Appointment expiring 1956

F. A. HILL	Grand Forks
C. H. PETERS	Bismarck

Appointment expiring 1957	
C. O. McPHAIL	Crosby
ROBERT FAWCETT	Devils Lake
Appointment expiring 1958	
F. D. NAEGELI	Minot
W. E. C. LANCASTER	Fargo
Advisory Committee to Public Assistance Division of State Welfare Board:	
E. T. KELLER	Rugby
R. W. RODGERS	Dickinson
E. J. LARSON	Jamestown
Liaison Committee to North Dakota Bar Association:	
C. H. PETERS, chairman	Bismarck
C. A. ARNESON	Bismarck
G. R. LIPP	Bismarck
Member Governor's Health Planning Committee:	
P. H. WOUTAT	Grand Forks
Liaison Committee to North Dakota Hospital Association:	
R. O. SAXVIK	Jamestown
K. E. FRITZELL	Grand Forks
Liaison Committee to the North Dakota Pharmaceutical Association:	
G. A. DODDS, chairman	Fargo
C. H. PETERS	Bismarck
M. P. CONROY	Minot
R. D. NIERLING	Jamestown
M. S. JACOBSON	Elgin
ROBERT PAINTER	Grand Forks
Committee on School Health:	
O. W. JOHNSON, chairman	Rugby
W. H. GILSDORF	Valley City
PERCY OWENS	Bismarck
J. H. CLARK	Minot
L. G. PRAY	Fargo
R. F. GILLILAND	Dickinson
R. F. McLEAN	Hillsboro
ELLIS OSTER	Ellendale
L. B. SILVERMAN	Grand Forks

REFERENCE COMMITTEES

- To consider reports of President, Secretary, Executive Secretary, and Treasurer:

M. S. JACOBSON, chairman	Elgin
GUNDER CHRISTIANSON	Valley City
F. R. ERENFELD	Minot
T. E. PEDERSON	Jamestown
- To consider reports of the Council, Councillors, and Special Committees:

BRUCE BOYNTON, chairman	Grafton
ROBERT GILLILAND	Dickinson
A. K. LEWIS	Lisbon
J. F. SCHNEIDER	Fargo
- To consider report of the Delegate to A.M.A., Medical Center Advisory Council, and Committee on Medical Education:

JOSEPH D. CRAVEN, chairman	Williston
L. E. WOLD	Fargo
KEITH FOSTER	Dickinson
R. W. McLEAN	Hillsboro
- To consider reports of Standing Committees, except Committee on Medical Education, Medical Economics and its Sub-Committee:

A. R. SORENSON, chairman	Minot
R. C. PAINTER	Grand Forks
GEORGE C. FOSTER	Fargo
C. V. BATEMAN	Wahpeton
JOHN VAN DER LINDE	Jamestown
- To consider reports of Committee on Medical Economics, including Sub-Committee on Veterans Medical Service, Committee on Prepayment Medical Care, and Committee on Rural Health:

WILLIAM FOX, chairman	Rugby
GEORGE M. HART	Minot
CARL BAUMGARTNER	Bismarck
F. A. HILL	Grand Forks
A. C. KOHLMMEYER	Larimore
O. C. GAEBE	New Salem
- Committee on Resolutions, to include new business:

C. H. PETERS, chairman	Bismarck
V. J. FISCHER	Minot
G. W. TOOMEY	Devils Lake
- Committee to study the report of the Committee on Constitution and Bylaws:

F. A. DE CESARE, chairman	Fargo
J. A. SANDMEYER	Grand Forks
A. F. HAMMARGREN	Harvey
R. W. HENDERSON	Bismarck
- Committee on Credentials:

A. C. KOHLMMEYER, chairman	Larimore
O. C. GAEBE	New Salem

PROCEEDINGS OF THE HOUSE OF DELEGATES of the North Dakota State Medical Association Sixty-Ninth Annual Meeting

Held at Aberdeen, South Dakota, in conjunction with the South Dakota State Medical Association to Celebrate Seventy-Five Years of Medicine in South Dakota
First Session, Saturday, June 2, 1956

The first session of the House of Delegates of the North Dakota State Medical Association was called to order by the Speaker of the House, Dr. G. A. Dodds, at 4:00 P.M. at the Alonzo Ward Hotel, Aberdeen, South Dakota, June 2, 1956.

Dr. A. C. Kohlmeyer, chairman of the Credentials Committee, reported that a quorum was present and all credentials were in order. The secretary, Dr. E. H. Boerth, called the roll and the following delegates responded:

G. W. Toomey, Devils Lake; R. M. Fawcett, alternate, Devils Lake; G. C. Foster, Fargo; A. K. Lewis, Lisbon; F. A. DeCesare, Fargo; L. E. Wold, Fargo; D. G. Jaehning, alternate, Wahpeton; R. C. Painter, Grand Forks; Bruce Boynton, Grafton; A. C. Kohlmeyer, Larimore; F. A. Hill, Grand Forks; J. A. Sandmeyer, Grand Forks; V. J. Fischer, Minot; A. R. Sorenson, Minot; N. A. Macdonald, alternate, Valley City; R. W. Henderson, Bismarck; Carl Baumgartner, Bismarck; C. H. Peters, Bismarck; Keith Foster, Dickinson; T. E. Pederson, Jamestown; John Van der Linde, Jamestown; R. W. McLean, Hillsboro; J. D. Craven, Williston.

Twenty-three delegates were present and the Speaker declared a quorum.

The following attended the meeting of the House of Delegates:

Drs. R. H. Waldschmidt, C. J. Gaspel, Joseph Sorkness, R. D. Nierling, W. A. Wright, J. C. Fawcett, R. B. Radl, P. H. Woutat, D. J. Halliday, R. W. Rodgers, O. A. Sedlak, and Mr. Lyle A. Limond.

A motion was made and seconded that the reading of the minutes of the last session be dispensed with and that they be accepted as printed in THE JOURNAL-LANCET.

It was moved by Dr. Pederson and seconded by Dr. Peters that the reports of the president, secretary, executive secretary, and treasurer be referred to Reference Committee No. 1. Motion carried.

REPORT OF THE PRESIDENT

Largely through the efforts of our efficient executive secretary and the splendid cooperation of our standing committees, much has been accomplished by our State Medical Association.

Just a year ago, when the Salk vaccine was so forcefully brought to the attention of the public, a special polio advisory committee under the chairmanship of Dr. Percy Owens, was created. This committee cooperated fully with the State Health Department and instituted a program which has not only been favorably accepted by the people but has been advocated by national health authorities as an example of how to handle the problem smoothly.

At the direction of the House of Delegates meeting in Bismarck in 1955, the Obstetrical and Gynecological Society last September formulated a plan for the investigation of maternal deaths. Each of the several district societies is represented on this committee, and Dr. John Moore acts as coordinator. In conjunction with that of the state health officer, a full report of their findings should appear elsewhere in this Handbook.

Heretofore, our association has had a single committee on Public Relations and Legislation. This year I took the liberty of dividing this into two committees; one to be concerned with Public Relations and the other with Legislation—two vital programs in our association. Since our state legislature convenes every two years, it would

seem that the Legislative Committee would have work to do only every other year. This is not so. Our concern is also with the national picture. In this session of the United States Congress, we have had to call twice upon this committee to relay the wishes of our group to our representatives in Washington. Perhaps we should consider sending one or two members of our Legislative Committee, or others, to Washington to meet our senators and congressmen in an attempt to foster better relations and to let them know just how we stand on matters coming before them. I also recommend that every doctor in our state make himself an ambassador for medicine any time he has contact with any of our legislators. I also urge an informed and constructive participation in public affairs both locally and on the national level.

The recent hearings in Washington, before the Senate Finance Committee on H.R. 7225 have been of vital importance to our profession. Medicine can remain free intellectually and professionally only as long as physicians can practice in a climate which is politically and economically free. We must, therefore, keep informed and be familiar with legislation that affects our profession. I urge each member to become more familiar with the Bricker Amendment, the Jenkins and Keogh bills, and the George Amendment to H.R. 7225, which would cover the totally disabled of all ages.

In September, I attended, with our chairman of Public Relations and our executive secretary, a National Conference on Public Relations in Chicago. This is a most important program of vital interest to every practitioner. I draw your attention to the report of Dr. Cartwright on this phase of our activities. I suggest that the expenses of the chairman, attending one of these national conferences, be included in the budget.

The Medical-Press Conference held in Minot in October was well attended. This was cosponsored by the State Hospital and Medical Associations. The speakers from Chicago, Mr. Robert M. Cunningham, Jr., editor, The Modern Hospital, representing the American Hospital Association and Walter Wiggins, M.D., assistant secretary, Council on Medical Education and Hospitals of the American Medical Association, spoke before the press, legislators, and physicians from the northwest corner of the state.

As an outgrowth of the liaison with the State Bar Association, the first Medical-Legal Conference was convened in Grand Forks early in December. Problems pertaining to both professions were ably discussed. These two types of conferences should be continued.

The American Heart Association organized a North Dakota chapter in our state under the capable leadership of Dr. Goehl of Grand Forks. The progress that has been made in heart surgery in the past decade and the ever increasing number of candidates for this type of rehabilitation certainly warrant our staunchest support of this undertaking.

The problem of rewriting our Constitution and Bylaws has been undertaken and completed by a special committee. Great care has been given to the revising and rewriting of our rules. I trust that these modifications meet with your approval.

The Cancer Society, under the inspired leadership of Dr. Carroll Lund, is continuing to do a job that merits great praise from both the profession and the public.

The Blue Shield program, which a year ago was a rather serious problem, now enjoys a healthier status. At the beginning of 1955, there was a sizable deficit, but through the employment of a full-time executive director and an increase of approximately 25 per cent in

new members, the plan now enjoys a good margin of profit. Now 347 physicians participating in the plan are giving their active support, and indications are that the Blue Shield will continue to grow and prosper.

Considerable discussion and correspondence was had with Dr. J. A. Myers, chairman of the board of editors of THE JOURNAL-LANCET. A plan was submitted before the council meeting in Fargo, December 10, 1955, and it was agreed that the dean of the Medical School and one man from each of the specialty groups comprise our board of editors. I hope that this change will be fruitful in giving North Dakota a better official publication.

I had the privilege of sitting in on the governor's Health Planning Conference. This committee deals largely with the distribution of federal funds under the Hill-Burton program and assists with the building of new hospitals, diagnostic centers, and rehabilitation facilities. It was the opinion of this group that North Dakota did not need more general hospitals, but instead that the funds be used for the replacement of existing units and the provision of rehabilitation facilities. Our membership on this committee must be active. I suggest that each year our nominating committee submit for nomination some member to the governor's Health Planning Committee.

Thirty years ago, in 1926, Dr. James Grassick's book, "North Dakota Medicine Sketches and Abstracts," was published. This year, Dr. A. D. McCannel and his committee have done a tremendous job in bringing this history up to date by publishing "Medical Milestones in North Dakota." I urge every physician to buy this volume, not just for sentimental reasons, but for its historic value.

I am deeply grateful to our executive secretary for his help and guidance in conducting the affairs of the association this past year. The vice-presidents have also rendered valued service. The several committees, for the most part, have all been active and given freely of their time and energy, and we are grateful for their help. It has been a privilege to have served this association during the past year. I trust that perhaps I have contributed something to its glowing future.

D. J. HALLIDAY, M.D., President

SECRETARY'S REPORT

MEMBERSHIP: The total membership for 1955 was 416. Of this number, 387 paid the regular membership fee, 12 were on a retired or limited basis, and 14 were honorary members. Three members were carried on a complimentary basis due to military service and age. Seven members passed away during the year and several have left the state. New members, however, are being steadily added to our roster.

Table 1 shows the annual membership for the past eight years. From this table can be seen a slow but appreciable gain in membership.

TABLE 1
COMPARISON OF ANNUAL MEMBERSHIP

	1948	1949	1950	1951	1952	1953	1954	1955
Paid memberships	356	364	356	362	362	368	378	387
Honorary memberships	5	13	12	11	10	12	15	14
Retired and limited						13	12	12
Dues cancelled, military service, and age exemption				11	12	16	6	3
	361	377	368	384	384	409	411	416

Table 2 shows the annual dues for 1956, which are coming in quite slowly. There are still a number of members who have not as yet paid their 1956 dues and

the District Medical Society secretaries and councillors are urged to use every possible means to collect the dues of these delinquent members.

TABLE 2

	April 30 1950	April 30 1951	April 15 1952	April 20 1953	April 10 1954	April 8 1955	April 19 1956
Paid-up members	309	307	249	296	323	323	334
Honorary members	11	11	8	9	13	14	16
To be honorary	1	2	2	3	4	3	6
Dues cancelled, military service			11	12	4	3	5
Limited					1	1	—
Retired					7	7	6
Complimentary (age)							1
	321	320	270	320	352	351	368

STATE ASSOCIATION MEMBERSHIPS

	1955				1956			
	Reg.	Rtd.	Comp.	Hon.	Reg.	Rtd.	Comp.	Hon.
First	82	1	—	3	73	—	2	3
Devils Lake	23	—	—	2	26	—	—	2
Grand Forks	68	—	1	2	51	—	1	2
Kotana	19	—	—	—	19	—	—	—
Northwest	60	2	2	3	44	—	2	3
Sheyenne Valley	9	2	—	—	8	1	—	1
Sixth	62	2	—	3	51	1	1	4
Southwestern	23	3	—	—	24	3	—	—
Stutsman	32	1	—	—	30	1	—	1
Traill-Steele	9	1	—	1	8	—	—	—
	387	12	3	14	334	6	6	16
	416				362			

A.M.A. GENERAL MEMBERSHIPS

	1955	1956
First	82	74
Devils Lake	23	28
Grand Forks	66	54
Kotana	18	19
Northwest	63	49
Sheyenne Valley	10	9
Sixth	60	56
Southwestern	14	24
Stutsman	32	31
Traill-Steele	9	8
	377	352

Two of the societies show a paid-up membership roster for the current year, but others have forwarded only partial reports. The Constitution and Bylaws of the North Dakota State Medical Association states that such dues should be forwarded to the state office not later than March 1 of the current year. It should be noted that, although March 1 is the stipulated date for the receipt of dues, this report is shown as April 19 to give an up-to-date picture of paid memberships.

The secretary has kept in touch with the operations of the state office and wishes to thank Mr. Limond and Mrs. Fremming for their cooperation in these matters of membership.

E. H. BOERTH, M.D., Secretary

EXECUTIVE SECRETARY'S REPORT

MEETINGS: Your executive secretary attended several meetings in behalf of the association and made many personal contacts with individual physicians, newspaper editors, legislators, radio station personnel, hospital administrators, nurses, dentists, and others. A rather complete listing will be found in the Travel Log a little further on in these pages.

I was fortunate in being able to attend at least 1 meeting in 8 of the 10 district medical societies this past year.

The School Health Lectures were again presented in cooperation with the North Dakota State Dental Association at 4 of the 5 Teachers Colleges. Dr. L. B. Silverman lectured at Mayville, Dr. O. W. Johnson at Minot,

Dr. W. H. Gilsdorf at Valley City, and Dr. Ellis Oster at Ellendale.

The fourth annual Medical-Press-Radio Conference was held in Minot on October 7, 1956, in partnership with the North Dakota Hospital Association. The state legislators in the Northwest District Medical Society area were also invited. Medical education was the theme of the meeting. From comments received by those in attendance, it can be considered a successful venture.

It is still felt, as was stated last year, that some of the committees are not too active. Your state office continues to aid in the work of those committees which are active. Your executive secretary was present at all committee meetings. It is again suggested that committee meetings be held in the fall or early winter months.

STATE OFFICE: Your headquarters' office is continuing in its efforts to be of even greater service to the total membership, public and private health agencies, and the public in general.

Mrs. G. K. Fremming (Margaret) continues to give fine service as office secretary.

As you all know, it is from here that the membership Newsletter and the Auxiliary's Newsletter is processed, the Physicians' Placement Bureau functions, the State Board of Medical Examiners' annual license renewals are handled, committee meetings are arranged and members notified, annual association and A.M.A. dues are processed, disbursement of Uniform Insurance Reporting forms is recorded, affairs of the newly-formed North Dakota Heart Association are handled, plus many other duties too numerous to mention.

LEGISLATION: There was no action on the state level, since this has been an off election year. On the national level, however, we have been confronted with the struggle opposing the cash disability section of HR 7225. As of the date of this report (April 20), the fight is not over and is still a close one. The members of our Committee on Legislation and others have been involved in letter writing and sending wires to our congressmen.

PHYSICIANS' PLACEMENT SERVICE: Nineteen North Dakota communities and 15 physicians or groups have contacted this office in regard to securing physicians.

Inquiries are still being received from several physicians concerning opportunities for the practice of medicine in our state. Several avenues of publicity are still being used to alert the public of the fact that the North Dakota State Medical Association is offering this placement service.

The 19 communities seeking a physician or an additional physician are: Anamoose, Belfield, Buffalo, Fairmount, Finley, Flasher, Fordville, Goodrich, Grenora, Killdeer, McClusky, McHenry, Milnor, Napoleon, Park River, Pembina, Strasburg, Towner, and Wishek. The 4 towns of those listed above, having a physician, but wanting 1 or more are: Napoleon, Park River, Towner, and Wishek.

This office, as of April 1, 1956, has received word that 9 physicians have moved to North Dakota because of the efforts and publicity emanating from the physician's placement service.

ANNUAL SESSION: Your executive secretary has had little to do with this year's annual meeting, since we are meeting in Aberdeen, South Dakota, in cooperation with the South Dakota State Medical Association at the time of their seventy-fifth birthday. Our Committee on Scientific Program worked with South Dakota's committee in suggesting names of scientific speakers. What headaches we have experienced have come from the shortage of suitable sleeping rooms. Mr. John C. Foster,

executive secretary, South Dakota State Medical Association and his doctors have had the real tough jobs. In 1962, we will celebrate our seventy-fifth anniversary, and all doctors from the two Dakotas will be assured of good housing and a fine program in North Dakota.

U.N.D. MEDICAL SCHOOL SCHOLARSHIPS: The 1955 winners of our scholarships (totaling \$500), offered at the School of Medicine were as follows: anatomy, Stanley Dean Thompson; physiology and pharmacology, John Albert Retzlaff; bacteriology and parasitology, Arthur Emerson Mukomela; pathology, Robert Deward Klingbeil and Gerda Elizabeth Galambos (equal); first year, Wolfgang Walter Oppelt.

THE TRAVEL LOG:

1955—
May 6-7, Bismarck. Attended the organizational meeting of the North Dakota clinic managers.
May 22-25, Minneapolis. Attended annual meeting of the Minnesota State Medical Association with our president, D. J. Halliday, M.D.
June 2-10, Atlantic City. Attended annual meeting of the American Medical Association.
June 14, Bismarck. Attended meeting of governor's Health Planning Committee.
June 15, Bismarck. Attended eighth annual meeting of governor's Safety Conference.
June 17, Jamestown. Called on Drs. Freeman and Saxvik regarding Workshop on Mental Health.
June 18, Grand Forks. Attended meeting of the Advisory Committee to the Medical Center.
June 21, Bismarck. Attended Sixth District Medical Society meeting honoring Drs. Bodenstab and LaRose.
July 8-9, Grand Forks. Attended meeting of the North Dakota State Board of Medical Examiners.
July 15-18, Kenmare and Saskatchewan. Met Dr. D. J. Halliday for committee appointments.
July 28-29, Bismarck. Met Mr. Aubrey Gates, field director, Council on Rural Health of the A.M.A. and Dr. K. G. Vandergon, chairman, Committee on Rural Health, North Dakota State Medical Association.
July 30, Bismarck. Met Dr. Engelbach of Dallas, Texas, Mr. James Osborne of Minneapolis, Mr. James Fenelon of Fargo, and Mr. Kenneth Mosser of Bismarck.
August 2-5, Jamestown, Valley City, Fargo, and Wahpeton. Called on officers, councillors, and delegates of the 3 District Medical Societies.
August 6, Bismarck. Met representatives of the State Health Department, Cancer and Tuberculosis Societies regarding the mobile x-ray units.
August 10-13, Kenmare, Minot, Rugby, Devils Lake, and Grand Forks. Called on officers, councillors, and delegates of the 3 district medical societies.
August 25-26, Minot and Kenmare. Attended Northwest District Medical Society meeting. Visited Dr. Halliday on association affairs.
August 29—September 3, Chicago. Attended A.M.A. PR Institute with Drs. D. J. Halliday and John T. Cartwright.
September 9, Bismarck. Attended meeting of the State Advisory Committee on Polio Vaccine.
September 10, Jamestown. Attended annual meeting of the North Dakota chapter of the American College of Physicians.
September 16-17, Jamestown. Attended annual meeting of the North Dakota Society of Obstetrics and Gynecology.
September 24, Jamestown. Attended annual meeting of the North Dakota chapter of the American College of Surgeons.
September 27, Fargo. Attended First District Medical Society meeting with Dr. Halliday.
September 29, Grafton. Attended Mental Health Workshop at the state school.
October 3-4, Bismarck. Attended the "Little White House" Conference on Education.
October 5, Devils Lake. Attended meeting of the Devils Lake District Medical Society.
October 7, Minot. Attended the Medical-Press Conference.
October 15-16, Omaha. Attended A.M.A. regional conferences on Legislation and Medico-Legal problems with Dr. C. H. Peters.
October 20-21, Fargo. Attended the North Dakota Hospital Association Institute on Public Relations and the fifteenth anniversary of Blue Cross in North Dakota.
October 25, Bismarck. Attended meeting of the Governor's Health Planning Committee.
October 27, Jamestown. Attended meeting of the Stutsman County District Medical Society.
November 3-4, Dickinson. Attended the annual meeting and workshop of the North Dakota Mental Health Association.

November 14, Bismarck. Attended the Sixth District Medical Society meeting.
November 19-20, St. Paul. Attended annual meeting of the North Central Medical Conference.
December 2-3, Grand Forks. Attended the first Medico-Legal Conference.
December 10-11, Fargo. Attended formal organization meeting of the North Dakota Heart Association, plus interim meeting of the council of the North Dakota State Medical Association and several committee meetings.
December 13, Bismarck. Attended Sixth District Medical Society Meeting.
1956—
January 6-7, Grand Forks. Attended the meetings of the State Board of Medical Examiners and the Advisory Committee to the Medical Center.
January 10, Bismarck. Attended a meeting of Blue Cross and Blue Shield representatives.
January 16, Bismarck. Attended meeting of the State Health Council.
February 6-17, Chicago. Attended meetings of the Medical Society Executives' Conference, Congress on Medical Education and Licensure, Federation of Medical Boards, and Blue Shield.
March 8-10, Portland. Attended A.M.A.'s Rural Health Conference with Dr. Keith Vandergon.
March 17, Aberdeen. Met Mr. John Foster, executive secretary, South Dakota State Medical Association; Mrs. S. C. Bacheller, Dr. R. G. Mayer, et al. concerning the combined meeting of our two associations.
March 19-23, Bismarck. Attended course on Epidemiology and the annual meeting of the North Dakota Public Health Association. Dr. Vandergon and I gave a report on Rural Health.
March 28-29, Bismarck. Attended N.P.L. Convention.
March 30, Bismarck. Met Dr. Halliday on association affairs.
April 4-5, Bismarck. Attended Unified Republican Convention.
April 10, Bismarck. Attended Sixth District Medical Society meeting.
April 12, Bismarck and Jamestown. Attended annual meeting of the North Dakota Tuberculosis and Health Association and a meeting of the Stutsman County Medical Society.
April 13, Fargo. Attended annual meeting of the North Dakota Press Association.
April 14, Jamestown. Attended annual meeting of Clinic Managers of North Dakota.
April 24-25, Bismarck. Attended the twenty-second annual meeting of the North Dakota Hospital Association.
April 26, Devils Lake. Attended Cancer Seminar of the Devils Lake District Medical Society.
April 27, Grand Forks. Attended Cancer Seminar of the Grand Forks District Medical Society.
April 30, Fargo. Attended Cancer Seminar of the First District Medical Society.
May 1, Jamestown. Attended Cancer Seminar of the Stutsman County District Medical Society.
May 2, Bismarck. Attended Cancer Seminar of the Sixth District Medical Society.
May 3, Dickinson. Attended Cancer Seminar of the Southwestern District Medical Society.

FINANCE: The Treasurer's report shows a definitely improved balance. This has been caused by the increase in dues which the House of Delegates voted at the 1954 meeting in Grand Forks. We are getting closer to our goal of having one year's operating budget in reserve. Receipt of dues was at a slower rate this year as compared to last year. Sheyenne Valley and Devils Lake District Medical Societies were paid up 100 per cent on April 19, 1956. The status of the remaining district societies regarding payment of dues as of April 19, was as follows:

District	Number of unpaid members
Northwest	15
Grand Forks	14
Sixth	12
First	10
Traill-Steele	4
Southwestern	2
Kotana	1
Stutsman	1

It should be pointed out, for clarity's sake, that when the item of Total Fund Assets is noted in the Treasurer's

Report, \$19,625 of that total sum was from receipt of 1956 dues during the period January 1 through March 29, 1956.

THOUGHTS FOR THE FUTURE:

1. Upon receiving the results of the November elections, our legislative committee members and our councillors should be ready to act on a state and national level. In the councillor districts, the name of the personal physician to the newly-elected state senators and representatives should be sent to the state office. Another state legislative session commences in January 1957.

2. Constructive thought should be given to the idea of sending a delegation to Washington, D.C., once a year to meet our two senators and our two representatives.

3. It is suggested that our Committee on School Health consider having the school health lectureships at the Teachers Colleges during the regular school year rather than during the summer school sessions.

4. Our association should take a greater interest in the State Health Department. The office of the state health officer has been vacant for quite some time, and it should not continue so indefinitely. Possibly the \$10,000 a year salary is a deterrent in securing a qualified man who could and would understand and get along with the people of North Dakota. Thought should be given to supporting good legislation asked for by our State Health Department during the 1957 legislative session.

5. The suggestion that our association become incorporated as a nonprofit organization should be studied. Incorporation is presumed to be a defensive move in regard to income tax and legal matters.

ACKNOWLEDGMENTS: Your executive secretary wishes to express his sincere appreciation to our president, Dr. D. J. Halliday and those other splendid gentlemen for their efforts in behalf of this association. Once again this writer gives heartfelt thanks to all with whom he has had occasion to work during this past year in the association's program of public enlightenment to the great problems of medicine and of its efforts to bring ever-improving medical services to the people of North Dakota.

LYLE A. LIMOND, Executive Secretary

Dr. Hill moved that reading of the reports of the council, councillors, and special committees be referred to Reference Committee No. 2. This motion was seconded by Dr. Boynton and carried.

REPORT OF THE CHAIRMAN OF THE COUNCIL 1955-1956

The Council of the North Dakota State Medical Association had their regular scheduled meetings April 30 and May 1, 1955 at the Prince Hotel, Bismarck, North Dakota, immediately preceding the state meeting. All councillors were present.

The Council strongly recommended to the House of Delegates to set dates for the next spring meeting for both bodies and committees immediately before the combined North Dakota-South Dakota meeting at Aberdeen, South Dakota, and to be held there.

A committee of the Council was appointed to study clarification of the State Grievance Committee. At one time this committee was named to include the 5 immediate past presidents. The Constitution and Bylaws delegate this power to the Council. The study of the above to be made in conjunction with the permanent committee on Constitution and Bylaws.

The contract of the North Dakota State Medical Asso-

ciation with THE JOURNAL-LANCET was renewed for a period of one year.

There was discussion of changing the fiscal year from January 1 to December 31. This was referred to the permanent committee on Constitution and Bylaws.

Officers elected for the coming year were: Dr. J. C. Fawcett, chairman; Dr. A. R. Gilsdorf, vice-chairman; and Dr. R. D. Nierling, secretary.

Interim meeting of the Council was held on December 10, 1955, at the Gardner Hotel in Fargo. All councillors were present.

A report was received concerning revisions of the Constitution and Bylaws. This was most complete and detailed. Printed copies of the proposed changes are to be made and printed in the Handbook of the House of Delegates.

Dr. Archie McCannel gave the report of the Committee on Necrology and Medical History in regard to the history of North Dakota medicine. The book is to be entitled "Medical Milestones in North Dakota." A committee was appointed to review and evaluate the work done on this book and report at the next regular meeting.

The special Council committee is studying the proposal to have the Council act as the Association's Mediation Committee (instead of Grievance Committee). This report was referred to the committee on Constitution and Bylaws.

Dr. D. J. Halliday, president of the State Medical Association, suggested a historic exhibit on the pioneer doctor of North Dakota at the combined meeting of the North and South Dakota Medical Associations in June. The Council authorized Dr. Halliday to further explore the feasibility of such an exhibit.

A suggestion was made that the councillors of each district discuss with their district societies the advisability of electing the same delegate to the state association meeting for more than one year, because it takes a while for the new delegate to become acquainted with the work of the society, and he would become more valuable as a member of the House of Delegates with each successive term.

JOHN C. FAWCETT, M.D.

REPORTS OF COUNCILLORS

First District

The First District Medical Society held 9 meetings in 1955. These meetings were all held in the Town Hall of the Gardner Hotel, which is a larger room than was formerly used and is equipped with air conditioning and a public address system. The new facilities and the more spacious room were appreciated by the membership. The officers for 1955 were: Dr. Hugh Hawn, president; Dr. George Foster, vice-president; and Dr. Howard Hall, secretary-treasurer.

At the January meeting, the society voted to contribute \$50 to the National Society for Medical Research and the following committees were appointed: Public Health and Public Relations Committee—Dr. L. G. Pray, chairman; Dr. William Armstrong and Dr. A. L. Klein, Program Committee—Dr. Warren Macanley, Dr. William Nuessle, and Dr. Wayne LeBien. Medical Economics Committee—Dr. A. C. Burt, chairman; Dr. O. A. Sedlak and Dr. C. V. Bateman. Speaker for the January meeting was Dr. Kenneth A. Kohlstaedt, director of the Clinical Research Division of Lilly Laboratories, who presented a paper on experiences with a number of new drugs, particularly the one which has shown promise in hypercholesterolemia.

At the February meeting, Dr. Edmund B. Flink, professor of medicine at the University of Minnesota and chief of the medical services at Minneapolis Veteran's Hospital, gave an excellent paper on "Problems Associated with Metabolic Alkalosis."

On March 28, 1955, the North Dakota Cancer Society provided the scientific program. Dr. Carroll Lund introduced the two speakers of the evening, who were: Dr. A. J. Kremmon, professor of surgery, Columbia Presbyterian Medical Center, New York City; and Dr. M. M. Kligerman, radiologist at the same clinic. Drs. Kremmon and Kligerman discussed the management of carcinoma of the breast.

At the April meeting, the society voted to reaffirm its previous resolution requesting prompt and vigorous action to assure protection of St. John's Hospital from flooding. The Fargo City Commission was so notified. The speaker at the April meeting was Dr. Maurice Stauffer, consultant in gastroenterology at the Mayo Clinic. Dr. Stauffer spoke on "Clinical and Laboratory Clues for Diagnosis and Treatment of Liver and Biliary Tract Problems." The Public Health Committee was active in making arrangements for the Salk poliomyelitis vaccine and, in view of reports of complications, a special meeting of the officers and members of the Public Health Committee was held on May 6, 1955. On that date, the society recommended temporary delay of mass immunizations until further information could be obtained as to the safety of the vaccine.

At the September meeting, our speakers were Dr. James Halliday, president of the North Dakota State Medical Association, and Mr. Lyle Limond, executive secretary. Dr. Halliday and Mr. Limond both discussed state medical problems.

At the meeting on October 25, 1955, the secretary read a letter requesting that the society elect a representative on the Maternal Mortality Review Board. Dr. Frank DeCesare was appointed. The president appointed Dr. W. E. G. Lancaster to head Medical Education Week promotion. The speaker was Mr. Philip Vogel, Fargo attorney, who gave a most interesting talk on estate planning.

At the November meeting, the society voted to reaffirm their approval of fluoridation of the city's water supply. A letter to the proper authorities in Fargo was to be sent by the secretary. The speaker at the meeting, Dr. Sidney H. Dressler of Denver, Colorado, was sponsored by the North Dakota State Tuberculosis and Health Association. Dr. Dressler spoke on the treatment of tuberculosis in children.

At the annual meeting in December, new officers elected were: president, Dr. George Foster; vice-president, Dr. Ralph Weible; secretary-treasurer, Dr. A. L. Klein; and censor, Dr. Earl Haugrud. Delegates to the state convention were: Drs. Bateman, Foster, Lewis, Wold, DeCesare, and Schneider. Alternate delegates were: Drs. Jaehning, Hawn, Nagle, Fortney, Melton, and C. M. Hunter. Dr. V. G. Borland was elected councillor for the First District.

Seven new members were elected to the society during the year. This brought the total membership of active members to 88; 60 of these members practice in Fargo. In addition to the active members, the society has 1 honorary member, 1 retired member, and 5 associate members. The associate members are members of the staff of the Fargo Veterans Administration Hospital. There were no deaths from our membership during the year 1955.

V. G. BORLAND, M.D., Councillor

Second District

The Devils Lake District Medical Society held 9 regular scheduled meetings during the year 1955. The turnout for the meetings was quite good on the average. This society particularly noted the fact that most absentees were some of the younger men who had just been taken into the society, over the course of the last two to five years. Some of these men had scarcely attended a meeting in the past couple of years. There was discussion at the time as to whether some action should be taken on a state level requiring attendance at a certain number of meetings a year to keep their membership in good standing. No action was taken. This society subscribed to and sent *Today's Health* to all libraries and schools in this district.

A brief discussion was read by this councillor at one of our meetings concerning the interpretation of the functions of the various components of the state organization, such as the Council, House of Delegates, and committees.

It goes without saying that on several occasions there were lengthy discussions with regard to the operation and policies of the Blue Shield. Our representative on the board of directors, Dr. Louis F. Pine, has been quite active in attending these meetings and participating in discussions since his appointment.

The society entertained and enjoyed a fine program of the Cancer Caravan, and the State Tuberculosis Society. On another occasion, we had as guest speakers, Dr. Koons and Mr. Gustafson of the state Public Health Department. We had one joint meeting with the Devils Lake District Dental Society. The society passed a resolution of cooperation in any investigation of maternal deaths and appointed Dr. C. A. Corbett as our representative on the review board. During the year, we had 7 outside speakers, and one evening of film.

Officers elected for 1956 are: president, Dr. G. W. Seibel, New Rockford; vice-president, Dr. Thomas Longmire, Devils Lake; and secretary-treasurer, Dr. Louis F. Pine, Devils Lake. Our delegates to the state meeting are: Dr. G. W. Toomey and Dr. W. R. Fox. Alternate delegates are: Dr. E. J. Schwinghamer and Dr. Robert M. Fawcett.

JOHN C. FAWCETT, M.D.

Third District

The Grand Forks District Medical Society, under leadership of Drs. Haunz and Culmer, has enjoyed a very fine season for 1955 and 1956. There are 64 members in the society.

Throughout the year, we have had a total of 9 scientific meetings of high caliber and excellent papers. The faculty of the University of North Dakota Medical School has contributed a great deal.

NELSON A. YOUNGS, M.D., councillor

Fourth District

The Fourth District consists of the Northwest District Medical Society with headquarters in Minot. This society has a grand membership of 57 active members and 7 other members. Dr. W. R. Taylor, formerly of Kenmare, we carry in military service.

We had 6 regular meetings of the society during 1955, in addition to an annual picnic which was in charge of Dr. Frank Wheelon. This meeting was held in August.

At the February meeting, Dr. Lee Christoferson, of Fargo, spoke on "Vascular Anomalies of the Central Nervous System." The meeting was well attended and the doctor gave a very interesting talk.

The March meeting was turned over to the North

Dakota Cancer Society and the program was given by Dr. Childs and Dr. Gould. Dr. Lund was the moderator. We had an excellent turnout.

The April meeting was devoted to public education in North Dakota. An address was given by Harry Selznick.

At our September meeting, a film was shown by Wyeth, Inc.

At the November meeting, tuberculosis was discussed. Dr. Robert High and Dr. B. Mukerji of Perpetua, India, were the speakers.

There were no meetings during the summer months, with the exception of the picnic in charge of Dr. Wheelon.

During the year we have taken in 10 new members: Dr. G. D. Anderson, Harvey; Dr. B. E. Briggs, Velva; Dr. A. G. J. Cullum, Minot; Dr. J. R. Ervin, Minot; Dr. L. A. Giltner, Minot; Dr. C. B. London, Minot; Dr. Gale Richardson, Minot; Dr. C. F. Schnee, Harvey; and Dr. R. E. Dormont, Minot.

During the year 6 members left the society: Dr. R. Cranston, Tioga; Dr. A. G. J. Cullum, Minot; Dr. B. A. Girard, Mohall; Dr. D. B. Horner, Minot; Dr. H. K. Kaemerle, Stanley; and Dr. R. B. Woodhull, Minot.

Officers for the year are: Dr. Frank D. Naegeli, president; Dr. John J. Ayash, vice-president; and Dr. William Kitto, secretary-treasurer. Delegates are: Dr. George M. Hart; Dr. A. F. Hammargren; Dr. Fred Erenfeld; Dr. V. J. Fischer; and Dr. A. R. Sorenson. Alternates are: Dr. L. H. Kernott, Jr.; Dr. W. B. Huntley; Dr. J. L. Devine, Jr.; and Dr. O. S. Uthus. Board of Censors are: Dr. G. S. Seiffert; Dr. Fred Erenfeld; and Dr. M. W. Garrison.

A. D. McCANNEL, M.D., Councillor

Fifth District

The Sheyenne Valley Medical Society held 8 medical meetings in 1955. Most of these meetings were informal dinner meetings.

Speakers and topics were: Dr. J. J. Spier—"Collagen Diseases"; Dr. O. A. Sedlak—"Problem of Appendicitis"; Dr. J. F. Houghton—"Diseases in the Younger Age Group"; and Dr. G. C. Foster—"Problem of Hoarseness."

The cancer part of our program was well attended and enjoyed.

During the year, Dr. W. L. Fennell of Cooperstown transferred to another society.

Officers for 1956 are: president, Dr. N. A. Macdonald; vice-president, Dr. W. H. Gilsdorf; secretary-treasurer, Dr. C. J. Klein. Delegate: Dr. G. Christianson. Alternate: Dr. N. A. Macdonald.

W. H. GILSDORF, M.D., Councillor

Sixth District

The Sixth District Society held 6 meetings during 1955 with an average attendance of 40. The membership at the end of the year was 68.

Officers for 1956 are: president, Dr. Ralph Vinje, Bismarck; vice-president, Dr. P. L. Blumenthal, Mandan; and secretary-treasurer, Dr. Robert Kling, Bismarck. Delegates are: Dr. O. C. Gaebe, New Salem; Dr. C. H. Peters, Bismarck; Dr. C. J. Baumgartner, Bismarck; Dr. M. S. Jacobson, Elgin; and Dr. R. W. Henderson, Bismarck. Board of Censors are: Dr. G. R. Lipp, Bismarck; Dr. E. D. Perrin, Bismarck; and Dr. P. L. Owens, Bismarck.

Speakers at the meetings were: February 22, 1955, Dr. Gordon Kamman of St. Paul, "Psychometric Testing in General Practice." March 31, 1955, Drs. Kligerman and Kremen of Columbia Presbyterian Medical Center,

New York City, "Radiologic and Surgical Aspects of Carcinoma of the Breast." This meeting was sponsored by the North Dakota Cancer Society. April 19, 1955, Drs. R. O. Saxvik, John C. Freeman, Smith, and Kooiker of the medical staff of the State Hospital, Jamestown, North Dakota, "Recent Advances in the Drug Therapy of Psychiatric Illness." June 21, 1955, Special meeting honoring 2 of the original founders of the Sixth District Medical Society—Drs. W. H. Bodenshtab and V. J. LaRose. Dr. R. F. Nuessle, president of the Sixth District Society, presented each of the honored guests with a scroll. Dr. L. W. Larson and Dr. R. B. Radl spoke as representatives of the Sixth District Medical Society, offering tributes to each of the guests. November 14, 1955, Dr. R. H. High of St. Christopher's Hospital for Children, Philadelphia, "The Treatment of Primary Tuberculosis in Children." This meeting was sponsored by the North Dakota Tuberculosis and Health Association. December 13, 1955, Dr. R. W. Utendorfer of Minneapolis, "Tumors of the Face and Neck."

Members who joined this society in 1955 are: Drs. Clyde L. Smith, Allen W. Wittchow, O. V. Lindelow, and Roger M. Berg, all of Bismarck; F. E. Anderson, Underwood, and W. J. Orchard, of Linton.

Members who have transferred from the society are: Drs. E. J. Mears, H. R. Davidson, Valentine C. Marr, Russell O. Saxvik, and DeWitt Shannon.

The society regrets the passing of Dr. Oliver DeMouly of Flasher. Dr. W. R. Enders of Hazen is in military service.

The Sixth District Medical Society appears to be in good general condition.

ROBERT B. RADL, M.D., Councillor

Seventh District

Since the last state meeting in May of 1955, the Stutsman County Medical Society (seventh district) has held 6 meetings.

On Thursday, May 26, 1955, Dr. Lloyd Musberger, a member of the local dental association, gave a talk on "Fluoridation of the City Water Supply." He illustrated the subject by means of charts, x-rays, and plaster of paris forms of children's teeth. A two-reel film, original telecast sponsored by the American Academy of General Practice by Wyeth Laboratories, on "The Management of Streptococcal Infections and Their Complications" was shown to the group.

The second meeting was held Thursday, October 27, 1955. Dr. John Freeman, clinical director of the State Hospital, and Dr. John Young, head of the outpatient department were the speakers for the evening. Dr. Freeman described the administration of the hospital and gave statistics as to growth types of psychiatric cases, length of stay in the hospital, admissions, discharges, deaths, and so forth. Dr. Young explained the functions of the outpatient clinic and its composition and discussed a few case reports. The outpatient clinic is composed of Dr. Young and a social worker, and there has been an average of about 150 interviews a month on an outpatient basis. Dr. Russell Saxvik, superintendent of the State Hospital, transferred membership from the sixth district to the seventh.

The third meeting was held Tuesday, November 15, 1955. Dr. Earl Dagg of Ellendale and Dr. John Swenson of Jamestown were voted into membership in the society. The program was sponsored by the North Dakota Tuberculosis Association. James Swomley, executive secretary, introduced Dr. Robert High, professor of pediatrics at Temple University in Philadelphia, who spoke on the "Treatment of Childhood Tuberculosis." Among the

salient points were the drugs used in the present day treatment of tuberculosis, namely mixtures of dihydro and streptomycin and isoniazid. He feels that childhood tuberculosis in its primary form is practically noninfectious and nontransmittable in contrast to the adult reinfection type.

The fourth meeting was held Thursday, January 26, 1956. Mr. Douglas Fisk, executive secretary of the local Chamber of Commerce, gave a short talk on the functions, organization, objectives, projects, and needs of the organization.

Officers elected for 1956 are: president, Dr. Thomas E. Pederson, Jamestown; vice-president, Dr. Neville Turner, LaMoure; and secretary-treasurer, Dr. R. D. Nierling, Jamestown. Delegates: Dr. T. E. Pederson and Dr. John Van der Linde. Alternate delegates: Dr. Russell Saxvik and Dr. John Elsworth.

The fifth meeting was held Thursday, February 23, 1956. Dr. D. Murray Cameron of Kulm, Dr. John Hewitt of Jamestown, and Dr. Harry D. Tripp of Jamestown were elected to membership. Dr. Tripp is a transfer from Columbus, Ohio. The program consisted of a talk by Dr. Nierling on "Erythroblastosis" and presentation of a case of "Kernicterus."

The sixth meeting will be held on April 12, 1956. Dr. James Cardy, pathologist at the University of North Dakota Medical School, will talk on pathological lesions of the stomach.

R. D. NIERLING, M.D., Councillor

Eighth District

As councillor of the newly formed Kotana District, I am pleased to submit the following report.

Kotana has been one of the smaller societies but has had a healthy growth of late and now has an active membership of 19.

Periodic meetings were held during the past year of which the following were significant:

On February 15, 1955, we held our annual meeting with the election of officers as follows: president, Dr. C. M. Lund; vice-president, Dr. F. O. Blankstein; and secretary-treasurer, Dr. D. E. Skjei. Delegate: Dr. J. D. Craven. Alternate delegate: Dr. A. K. Johnson.

Discussion included improving future meetings and a committee was appointed to arrange meetings.

In April, the Cancer Caravan visited Williston with Dr. Childs of the Mayo Clinic, who discussed x-ray therapy for mammary carcinoma. Dr. Arthur Saiki discussed the cytologic examination of body fluids.

On May 18, 1955, Dr. W. L. Macaulay of the Fargo Clinic presented an interesting program, together with color slides illustrating common dermatologic conditions.

On October 20, 1955, we convened at the Plainsman Hotel for dinner, after which Dr. E. A. Haunz of the Grand Forks Clinic discussed the management of diabetic acidosis in his usual vigorous and interesting manner.

January 25, 1956, our annual meeting was held at Craven-Hagan Clinic, and the following officers were elected for the ensuing year: president, Dr. D. E. Skjei; vice-president, Dr. G. E. Ellis; and secretary-treasurer, Dr. C. C. Borrud. Delegate: Dr. J. D. Craven. Alternate: Dr. A. K. Johnson.

Dr. John Keller was appointed a member of the State Maternal Mortality Committee. Discussion concerned increasing the number of scientific meetings for 1956 and the establishment of a uniform fee schedule for the Kotana District, especially Williston.

J. D. CRAVEN, M.D., Councillor

Ninth District

The Southwestern District Medical Society held 5 official medical meetings in 1955. All of these meetings were in Dickinson, North Dakota.

The first meeting on April 1, 1955, was a combination business meeting and Cancer Caravan discussion. The guest speakers were Dr. A. J. Kremen of Columbia-Presbyterian Medical Center, who spoke on "Carcinoma of the Breast," and Dr. M. M. Kligerman of Columbia-Presbyterian Medical Center, who spoke on the "Radiological Aspect of Cancer Treatment."

The second meeting was June 2, 1955. This was essentially a business meeting.

The next regular meeting was October 15, 1955. The guest speaker was Dr. Richard F. Raasch, roentgenologist at Dickinson, who spoke on "Modern Concepts of Roentgenology in Diagnosis and Treatment."

The fourth meeting was November 19, 1955. Scientific speaker was Dr. W. H. Hiller of Temple University. He was introduced by Mr. James A. Swomley of Bismarck, representing the North Dakota Tuberculosis Society. Dr. Hiller spoke on "Primary Tuberculosis in Children."

The final meeting was December 17, 1955. Prepublication discussion was held on "Medical Milestones of North Dakota." The response was good. At least four-fifths of the members want the book when it comes to press. Members were urged to contribute to the A.M.E.F. Dr. O. C. Maercklein gave a scientific paper on "Polycythemia Vera."

There are 25 active members in the Southwestern District Society plus 5 retired members. New members in our district in 1955 are: Dr. Gladys E. Martin and Dr. R. F. Raasch of Dickinson, Dr. Joseph A. Hilts of Hettinger, and Dr. Walter C. Hanewald of Richardton. Dr. Apollens Martens transferred from Killdeer to Bowman.

The following officers were elected for 1956: president, Dr. R. J. Dukart; vice-president, Dr. J. J. Moses; and secretary-treasurer, Dr. H. L. Reichert. Delegates: Dr. R. F. Gilliland and Dr. K. G. Foster. Alternate delegates: Dr. Julian Tosky and Dr. Robert Goulding. Councillors: Dr. A. J. Gumper, Dr. J. J. Moses, and Dr. A. A. Curiskis.

A. R. GILSDORF, M.D., Councillor

Tenth District

The Traill-Steele District Medical Society held 3 meetings during the past year, all of which were dinner meetings followed by business and scientific sessions.

Dr. Mervin Rosenberg of Hatton, North Dakota, and Dr. James Little of Mayville, North Dakota, were accepted as members during the year.

Officers for the coming year are: president, Dr. D. N. Mergens; vice-president, Dr. Mervin Rosenberg; and secretary-treasurer, Dr. R. W. McLean. Delegate: Dr. R. W. McLean. Alternate delegate: Dr. H. A. LaFleur. Censor: Dr. H. A. LaFleur.

The society, as well as the whole area, was saddened by the death of Dr. O. A. Knutson on September 25, 1955. His passing has been keenly felt by all his associates.

K. G. VANDERGON, M.D., Councillor

SPECIAL COMMITTEES

Committee on Emergency Medical Service

There appears to be no statewide civil defense plan in North Dakota, and, correspondingly, no plans appear to have been made for medical service in the event of enemy attack or other disaster.

The lack of interest in such plans is largely due to the immensity of the problem presented in planning for the care of the enormous number of casualties that could be expected to occur even with our sparse population should areas in this state become the targets of atomic attack.

It is believed, therefore, that efforts should at first be focused on providing plans and means for dealing with less extensive disasters such as those due to fires, explosions, tornadoes, and wrecks of buses or trains. These are emergencies that have occurred in other and neighboring states and communities and have narrowly missed our own. They can be cited as examples to awaken interest in emergency care plans; measures taken by other communities to cope with these can be studied and their mistakes evaluated.

When each community has developed its own local emergency medical care plan, there will be a skeleton framework which can be expanded to take care of greater problems, and by coordination of these plans, a workable statewide plan could be evolved.

Every hospital, however small its staff, every community throughout the state, should have a written disaster plan taking into account the available doctors, dentists, pharmacists, laboratory technicians, nurses, and nurse's aids. In this plan, every individual should be assigned a definite task with alternates for the key positions. A standard plan of procedure for the handling of mass casualties must be decided upon and made familiar to all concerned.

It is therefore proposed:

1. To send a questionnaire to all hospitals in the state to obtain accurate information as to the number of hospitals having disaster plans and to evaluate the nature of these plans.
2. To make this information available to hospital staffs in the state to assist them in formulating or revising their plans.
3. To encourage hospital staffs without plans to formulate them and to assist in drawing up plans as needed.
4. To draw up a master plan which will coordinate unit plans in such a way that a disaster-stricken area can quickly receive effective help from surrounding communities by—
 - a. Emergency mobile surgical and/or medical teams organized so as to be quickly available.
 - b. Provision of emergency medical supplies.
 - c. Provision of hospital beds for casualties that can be evacuated.

If this can be accomplished, then the state medical society will be in a position to present the state civil defense authorities with a basic plan which can be expanded into the more extensive program that is needed.

R. F. NUESSELE, M.D., Chairman

Committee on Displaced Physicians

Your committee has had 2 meetings this past year with all members being present.

The Board of Medical Examiners established the Displaced Physicians Program in January 1949 and terminated the same in 1952. During this period, 22 displaced physicians were processed, and, of this number, 15 were issued restricted licenses. Of these 15, 2 have left the state and the remaining 13 are all in active practice. During the past year, 7 of these men were re-examined by the Board and were issued unrestricted licenses, while 6 remain to be re-evaluated and re-examined in 1956 and 1957.

Your committee welcomes reports either favorable or

unfavorable from any doctor or hospital in the state relative to the type of medical service, ethics, and behavior of any of these doctors.

Your committee should remain active until the last displaced physician has been processed, which will be in July 1957; at that time, the committee should by necessity be discharged.

It is my personal opinion that due to the large number of foreign graduates, who are already in the United States and will continue to arrive each month, it might be wise to set up a special committee on foreign medical graduates.

A cooperating committee on foreign medical graduates has recently been established in Chicago and will consist of 8 trustees, 2 from the A.M.A., 2 from the Federation of State Medical Boards, 2 from the American Hospital Association, and 2 from the Association of American Medical Colleges. This committee will attempt to find a fair method of evaluating every foreign medical graduate on an individual basis for the reason that there is no possible way to even attempt surveys or appraisals of the 500 and more foreign medical schools in operation. The present opinion appears to be that a few of these schools are of the same high standard as United States and Canadian Medical Schools.

The North Dakota Board of Medical Examiners has experimented with various requisites for medical licensure of foreign graduates, keeping in mind the grave responsibility they have in the selection of qualified, well-trained, and ethical physicians. At the present time, the ruling is that United States citizenship, plus certification of any United States specialty board, are necessary for licensure. In this manner, no highly trained physicians will be excluded.

This matter relative to foreign graduates is of great importance and concern to every licensing board in the United States and requires an attitude of both tolerance and discrimination to prevent a double standard of medical education from being established, to be fair to graduates of United States medical schools, and to carefully process foreign graduates, admitting the competent and excluding those whose education and training has been substandard.

C. J. GLASPEL, M.D., Chairman

Committee on American Medical Education Foundation

Donations to the American Medical Education Foundation declined in North Dakota from \$2,600 in 1954 to \$2,148 in 1955. Thirty-three members donated an additional \$2,032 directly to their various alumni associations. By so donating, however, that sum is lost as far as credit on A.M.E.F. books is concerned. Those who have seen fit to route their donations through the A.M.E.F. have found that their gift is acknowledged by both the A.M.E.F. and the school to which the donation was directed.

Additional states are seeking a raise in dues as a means of meeting A.M.E.F. needs. California, Idaho, and Nevada have joined Illinois and Utah as states using this method of contribution to A.M.E.F. Within the week, Minnesota has announced its decision to do likewise. The argument for increasing dues is essentially that too small a percentage of physicians are contributing voluntarily and that a dues increase would equitably spread the burden over all.

The first National Medical Education Week has been scheduled for April 22 to 28, 1956. Four national organizations—the Association of American Medical Colleges, the National Fund for Medical Education, the

American Medical Education Foundation, and the American Medical Association—are cooperating in an effort to bring to public attention the great expansion in medical education in recent years, at the same time emphasizing the importance of our medical schools in the health program of the nation, not only in providing an increasing number of doctors but in medical progress through research and in postgraduate education. In 1954-1955, 57,273 graduate students were enrolled in courses conducted by medical faculties in the United States.

We are relying heavily on the Women's Auxiliary in our fund raising and educational efforts. The American Medical Association has, at a recent meeting, passed a resolution requesting their participation in the American Medical Education Foundation program. This year a new feature of their program is the eighty dimes campaign, a special appeal designed to apprise the American public of the need for voluntary financial contributions to support the nation's 81 medical schools. The auxiliary's goal for 1956 is \$100,000.

This year, committees are being appointed from each district, and it is hoped that through such committees a better understanding of the aims and needs of our medical schools can be disseminated.

W. E. C. LANCASTER, M.D., Chairman

Committee on Mental Health

The Committee on Mental Health had no meeting this past year.

Members of the committee are: John G. Freeman, Jamestown, chairman; L. H. Fredricks, Bismarck; G. D. Icenogle, Bismarck; R. C. Turner, Grand Forks; L. H. Kernott, Jr., Minot; Leo B. Froke, Grand Forks; L. A. Christoferson, Fargo; R. D. Nierling, Jamestown; J. T. Cartwright, Bismarck; and M. J. Geib, Moorhead, Minnesota.

In accordance with the recommendations and discussions of previous years, it was intended by the chairman to call a meeting at Grafton, North Dakota, as there has never been a meeting at the Grafton State School to the knowledge of the chairman. It was desired to call this meeting at the same time as a workshop by the Mental Health Association and a meeting of the district medical society.

Pamphlets entitled "Milestones to Marriage" were circulated to members by mail. "Milestones to Marriage" is educational material written for teenagers (seniors in high school) by Dr. Lloyd Rowland, educational psychologist, who also wrote the "Pelican Series."

"Milestones for Marriage" has been approved by the A.M.A. Council on Mental Health; however, that council also requested that the material be reviewed by the state committees.

It is desired by the Women's Auxiliary of the A.M.A. to introduce the material through the Women's Auxiliary into mental health teaching classes of high schools by means of mailing a monthly letter to seniors, the series including 9 letters.

The members of your North Dakota Committee were contacted in regard to the matter as above, and favorable replies were received from 7, and no negative replies were received.

Your chairman, because of his location at the State Hospital, would like to add: The Committee on Mental Health in 1955 discussed the need for establishing new mental health laws. A new mental health law has been drafted by the Legislative Research Committee, who will present it to the 1957 Legislative Assembly where prospects for its approval look good.

In regard to the recommendation made by the 1955

committee, the increased number of admissions and terrifically faster pace at the State Hospital have so far made it impossible to give adequate follow-up information to the family physician regarding care and treatment in the hospital, except on special cases.

JOHN G. FREEMAN, M.D., Chairman

Committee on Diabetes

The primary function of the Committee on Diabetes has been to encourage and coordinate an annual Diabetes Detection Drive throughout the state under sponsorship of constituent local medical societies. The committee is composed of 10 members, 1 representing each of the respective local medical societies.

Prior to National Diabetes Week (sponsored by the American Diabetes Association) which is held in November each year, each committee member is asked to request his respective medical society to approve and sponsor a local diabetes detection drive. During Diabetes Week in 1955, over 1,000 local county and district medical societies throughout the nation sponsored diabetes detection drives. Unfortunately, last year only one society in the entire state participated in a detection drive, despite the fact that it has been repeatedly established that approximately 1,000,000 undiscovered cases of diabetes exist in this country. Some interesting facts appear worthy of emphasis in the light of experience gained from this single diabetes detection drive:

1. The medical society approved the drive and appointed a committee.

2. Although the medical society was credited with sponsorship of the program, no expense whatever was incurred and the committee had only one short meeting. No one had to really do any work.

3. The local Junior Chamber of Commerce purchased the necessary Drey-Paks and supervised distribution and collection of tests.

4. The tests were performed rapidly and easily by volunteers.

5. Over 40 "positive" cases reported to physicians for further examination.

6. While only 925 tests were performed, there was a surprising yield of 9 hitherto unknown bona fide new cases of diabetes. The high yield was largely attributed to cooperation of local physicians in performing glucose tolerance tests on the majority of cases not exhibiting frank diabetes mellitus on a single blood sugar test. (This had been on official recommendation of the committee.)

7. The local medical society enjoyed considerable favorable publicity, both press and radio, for offering this free service to the public.

Previous experience throughout the nation each year has reaffirmed the fact that the free diabetes detection drive sponsored by the local medical societies has engendered much needed public good will toward the medical profession. These programs were endorsed by the House of Delegates of the A.M.A.

The advent of the glucose oxidase reaction (Tes-Tape) and more recently Clinitest promises to simplify diabetes detection programs to the extent that people will be able to test themselves in private by merely dipping a piece of paper in the urine specimen and the presence of sugar is as easily detected as acidity or alkalinity on litmus paper. When these tests become available (probably free of charge) to medical societies, the detection drive will be so simple that every medical society should want to participate. While no official statements have been made by the American Diabetes Association, it seems

quite likely that these testing devices will be available for the 1956 detection drive.

E. A. HAUNZ, M.D., Chairman

Dr. Jaehning moved that the reports of the Delegate to the A.M.A., Medical Center Advisory Council, and the Committee on Medical Education be referred to the proper Reference Committee, No. 3.

This motion seconded by Dr. Boynton and carried.

Report of the Delegate to the American Medical Association

Your delegate attended all meetings of the House of Delegates of the American Medical Association at the annual session in Atlantic City and at the clinical session in Boston. He continues to serve as a member of the Council on Rural Health and is chairman of the Committee on Medical and Related Facilities of the Council on Medical Service.

The House of Delegates of the A.M.A. continues to be actively concerned with problems affecting relationships of doctors with themselves, with the public, with the institutions in which they work, and with government bodies of all sorts.

INTERPROFESSIONAL RELATIONSHIPS

As directed by the House of Delegates, the Council on Medical Service, through its committee on Medical and Related Facilities is currently undertaking a study of the relationship between full-time teachers of medicine and the private practice of medicine. A report on this situation will be presented at the next meeting of the House.

GRIEVANCE COMMITTEES

This Committee, of which Dr. J. Culpepper is chairman, has made an extensive study of the subject of grievance committees and has written a report containing their recommendations. This report has been published in a pamphlet and is available through the executive secretary's office.

JOINT COMMISSION ON ACCREDITATION

Dr. W. C. Stover has been appointed chairman of a committee to study the activities of the Joint Commission on Accreditation. This committee has held several meetings and will also report at the next meeting of the association. It is felt that the activities of this committee will be a great help in clarifying and modifying certain rulings of the Joint Commission which do not meet with the approval of the profession.

MEDICAL PRACTICES

A committee, with Dr. Stanley R. Truman of Oakland as chairman, has made an extensive study of various aspects of medical practice which lead to unethical practices and unfavorable publicity. This committee presented an extensive report to the House of Delegates at the June 1955 session with the recommendation that a continuing committee be appointed. They further recommended that a department of general practice be established in each medical school, that teaching programs be approved which afford the medical student opportunities for experience in general practice, and that arbitrary discrimination against general practitioners in hospitals be stopped. The House approved this report and also suggested that further study be given to the matter of diagnostic, surgical, and medical work for the proper appraising of fees.

Another phase of this subject was carried on by another committee which suggested that specialty boards reappraise their rulings and encourage a period of general practice before a man is certified as a specialist.

This is a rather far reaching thought, and is, at present, under some consideration. It does not seem likely that it will be adopted in the near future.

The organized efforts of general practitioners to achieve more recognition and more dignity for their field has been meeting with a great deal of success. The House of Delegates of the A.M.A. has been in complete sympathy with the program which gives the doctor a position in his community and hospital appointments commensurate with his training and ability regardless of his specialty or board rating.

RELATED WITH OSTEOPATHY

At the June 1956 session, a detailed report was presented by a committee headed by Dr. John Cline which recommended that osteopaths no longer be considered cultists and that doctors of medicine be permitted to consult freely with osteopathy and teach in osteopathic schools. This report was not adopted by the House of Delegates, and no further action seems likely in the near future which would lead to a change in the relationship with osteopaths.

PROFESSIONAL LIABILITY

A great deal of concern is being expressed by doctors all over the country regarding the very high rates for malpractice insurance, the large number of suits, and the large judgments being given. Considerable study has been given to this problem and the A.M.A. sponsored 3 large medical-legal symposiums in different parts of the country last fall. They also have built up a very fine legal staff located in the head office in Chicago with one or two members in the Washington office. It is felt that closer cooperation with the legal profession, better education of doctors, and a greater awareness of the problem may be helpful. Perhaps in no other field are the actions of the individual doctor more important than in this.

LEGISLATION

During the past year, the Washington office has been changed and greatly strengthened so that now it functions much more smoothly than previously. Methods have been developed of properly organizing the testimony to be given before senate committees so that there will be less reduplication and overlapping. It is important that those testifying before the senate and house committees be able to make their point very concisely and clearly. The Washington office has made considerable study of this problem and has improved the organization of such testimony a great deal. We now have a committee on legislation which has members from each general area. Each member is responsible for his own area, and it is his function to get in touch with the medical associations in his area and ask them to forward their opinion to Washington when necessary. This has resulted in a very effective presentation of the viewpoint of the profession before their own senators and representatives in Washington. In addition, the association has sponsored several district legislative conferences for the instruction and education of officers of state medical associations.

Jenkins-Keogh bills are still before Congress, but it seems rather unlikely that they will receive much consideration during this session. The Bricker Amendment continues before the Congress, but is unlikely to be adopted this session.

SOCIAL SECURITY

Practically all other professional groups, except the doctors, will be included in the social security system at this session of Congress. The official policy of the

A.M.A. is to oppose inclusion of doctors in this system; however, a poll of the members in each state is now being taken and when the results of this poll are in, the position of the association may be re-evaluated.

We have actively opposed portions of HR 7225, which is a bill to amend the social security system already passed by the house, and at this writing, in senate committee. There are two provisions in this bill which the association opposed: (1) the provision of cash benefits for total disability after the age of 50, (2) lowering payments to women from age 65 to 62.

At the beginning of the legislative session, it seemed almost certain that these provisions would be adopted; however, after extensive testimony and much work by the A.M.A. and some other groups, the secretary of Health, Education and Welfare, Mr. Folsom, recently spoke against these changes. As this is the official administration attitude, it seems possible that they will not be adopted. The A.M.A. is also on record as approving a thorough study of the entire social security system.

DISPENSING OF DRUGS

At the June 1956 session, section 8, chapter 1 of the principles of medical ethics was altered so that it now reads: "It is not unethical for a physician to prescribe or supply drugs, remedies or appliances as long as there is no exploitation of the patient." In effect, this means that a physician or group of physicians may dispense drugs and appliances as may be necessary in the conduct of their practice for which patients should be charged at rates comparable to charges made by others in that locality.

MEDICAL ETHICS

There is always some difference of opinion between members of the Council on Constitution and Bylaws, Judicial Council, and others concerned with medical ethics. There are those who believe that our current code of medical ethics is not applicable to modern conditions and should be drastically altered. At the present time, a continuing study is being made of this, but it seems unlikely that there will be very great changes made in the near future.

SALK VACCINE

The association extended commendation to Dr. Salk for his work in perfecting an antipoliomyelitis vaccine. They further recommended that the vaccine be distributed and dispensed in the same manner as all other biologicals. It was the opinion of the House of Delegates that there was no necessity for the government to purchase and supply Salk polio vaccine.

IOWA PHYSICIAN'S ACTION

In another resolution, the House of Delegates commended the action of Iowa physicians in defending the right of pathologists, anesthesiologists, and roentgenologists to be considered doctors of medicine entitled to collect their own fees. The decision of the court in Iowa defining the practice of pathology, anesthesiology, and roentgenology as the practice of medicine has been a distinct benefit to the profession.

JOINT COMMISSION ON MENTAL HEALTH

Dr. Leo H. Bartemeier, chairman of the A.M.A. Council on Mental Health, has been appointed chairman of the Board of Trustees of the new Joint Commission on Mental Illness and Health. This is an organization which will carry out the Mental Health Study Act passed by Congress earlier this year and will be actively concerned with the study of all opportunities for improved mental health conditions.

DUES

The House of Delegates recommended that the Board of Trustees consider an increase in dues of all association members with the increase designated for contribution to the American Medical Education Foundation. The Board of Trustees now has under consideration a proposal for raising the dues, part of which increase will go to the A.M.E.F. and part of which will be necessary for the general conduct of the affairs of the association.

As the activities of the association increase, there is always a need for more income. It is expected that there will be resolutions and recommendations for an increase in the dues at the next session of the House.

WILLARD A. WRIGHT, M.D., Delegate

Report of Representative to The Medical Center Advisory Council

Your representative has attended all meetings of the Medical Center Advisory Council since his appointment. The last meeting was on January 7, 1956, and the following items were considered:

1. *Applicants to medical school.* While the general policy has been to accept 40 students in the freshman class, it appears impossible to get 40 well-qualified applicants from the state of North Dakota. Accordingly, a few applicants are being considered from out of the state. With the new counseling program for freshmen students in the university college program and closer supervision during premedical years, it is hoped that more qualified North Dakota students will be applying for medical school admission.

2. *Transferring of two-year medical school graduates.* Much of the difficulty of a few years ago in transferring students for their third and fourth years' training has disappeared during the past few years, and we have been informed that there has been little difficulty recently in transferring our graduates to good schools throughout the country.

3. *Plans for the rehabilitation and treatment center.* This proposal has been approved by the State Health Planning Committee, the Board of Higher Education, and the Medical Center Advisory Council and is now in the active planning stage. The State Health Planning Committee has recommended that funds be made available from Public Law 482 for aid in construction of an adequate building. Plans for such a building are being drawn. It is planned to house and coordinate a number of current university programs, such as psychological services, social services, vocational rehabilitation, occupational therapy, student health service, as well as a diagnostic and outpatient treatment facility adjacent to the School of Medicine for Rehabilitation Patients. It is the intent to accept only patients referred by their physicians for these services and to return the patients to their physicians with recommendations, unless treatment is requested by the physician.

It is also anticipated that request will be made to the state medical association for an advisory committee, possibly its Committee on Geriatrics and Rehabilitation.

Medical school authorities recognize that without the cooperation of the physicians of the state, any such program is bound to fail and that a coordinated program involving many programs of other agencies now scattered around the state will also be essential.

4. *Pathology department.* This department is currently undergoing a major change in its operation as pertains to the services it provides apart from its teaching duties. For many years, pathologists have been employed by the university, both for teaching and to provide pathology services to hospitals and physicians in

the state. Fees collected for these services have been collected and used by the university, thus putting the university and the medical school into the practice of medicine in competition with pathologists in private practice.

The pathologists at the medical school have long objected to this arrangement and have tried to obtain permission to perform the pathology services on a fee for service basis as private practitioners. This permission was finally granted by the State Board of Higher Education and the university authorities in March 1956, and plans are now under way to change to such a system. Details of arrangements are not available at this time.

In the opinion of your representative, the pathologists are to be commended for their efforts in this regard.

5. *Virus laboratory services for North Dakota.* This matter has been under discussion at the last two or three meetings. It was brought to the board's attention by the state health department. It was felt that a virus laboratory was needed in the state but that the state department of health does not have funds for operating such a laboratory. They inquired whether the medical school might not be willing to operate such a laboratory as a service to the people of the state. The matter was very thoroughly discussed at two meetings, and the Medical Center Advisory Council recommended that the medical school not enter into such a program. The opinion was that, in the first place, such a function is properly one for the state department of health and if necessary functions that should be performed by them are performed by other agencies, it may delay the date when the state legislature will appropriate adequate funds to the state department of health. In the second place, it was felt that, as in the case of the pathology department, the service load in such a laboratory could soon become of such size that it might interfere with the teaching program.

For these and other reasons, the Medical Center Advisory Council was of the opinion that the medical school should agree to cooperate with the state laboratory but not to the extent of establishing and operating a virus laboratory as a statewide service function, feeling that such should be established and operated by the state department of health.

Numerous other matters of less importance were discussed at the various meetings, but those mentioned above are considered of most importance to the physicians of the state and the state medical association. This report should be examined in conjunction with the report of the chairman of the committee on Medical Education as there will no doubt be amplification of some of these items in his report and considerable overlapping information.

Your representative plans to be at the meeting in Aberdeen and will be available for questioning and amplification of this report by the Reference Committee, if they so desire.

P. H. WOUTAT, M.D., Representative

Committee on Medical Education

This committee has not had a meeting this year, since there have been no problems for us to consider.

The committee has maintained close contact with Dean Harwood. Dean Harwood reports that the conditions at the medical school are very satisfactory. He states that the number of applicants for admission to the medical school, who are residents of North Dakota, shows a very satisfactory increase.

Dean Harwood informs us that the clerkships have worked out very satisfactorily. He states that the doctors

in cities to which clerks have been assigned have done everything possible to make the clerkship a success.

The students who have completed their two years of medical school here have had no trouble in transferring to other schools for the third and fourth years. Some students in their third and fourth years are having some financial problems. The amount of money available for loans to students for their third and fourth years is limited.

The main problem, therefore, as far as education of North Dakota medical students is concerned, is to find some way of making loans available to those that need financial assistance for their third and fourth years.

This committee recommends that the North Dakota State Medical Association's House of Delegates and Councillors consider this problem.

H. M. BERG, M.D., Chairman

Dr. V. J. Fischer made the motion that the reports of the Standing Committees, except the Committee on Medical Education, Medical Economics and its Sub-Committees be referred to Reference Committee No. 4. Dr. Peters seconded the motion and it carried.

Committee on Necrology and Medical History (1956)

*How good that ere the winter comes, I die!
Then ageless, in your heart I'll come to rest
Serene and proud, as when you loved me best.*

HANS ZINSER

OLIVER M. DE MOULLY, M.D.

Dr. O. M. DeMouly of Flasher, North Dakota, died July 26, 1955, in a Bismarck hospital after four days hospitalization. He had suffered poor health since January 1955.

Born in Mankato, Minnesota, June 18, 1891, the son of Mr. and Mrs. John DeMouly, he attended the University of Minnesota and Marquette University. He received his medical degree from Marquette University, Milwaukee, Wisconsin, in 1919. He and the former Rose Pearl White were married at Washburn, Wisconsin, September 4, 1916. Dr. DeMouly came to Mandan to take over his uncle's practice (Dr. Martin Krantz) for eight weeks while Dr. Krantz was away, and moved to Flasher at the end of the two months' period. He practiced in Flasher since 1919.

The Flasher community honored its doctor on the occasion of his thirtieth year of practice a few years ago. The Commercial Club of Flasher sponsored a dinner and presented him with a gift. Dr. DeMouly was a member of the American Medical Association; the Sixth District Medical Association; a charter member of the Flasher Lions Club; the American Railway Surgeons; fellow, American Geriatrics Society; Modern Woodmen; the United States Committee Incorporated in Support of the World Medical Association; Alpha Kappa Kappa medical fraternity; and St. Lawrence's Catholic Church at Flasher.

Besides his wife, he leaves one daughter.

ADRIAN D. STROM, M.D.

The partly frozen body of Dr. A. D. Strom was found in the early morning of November 23, 1955, in the southern part of Langdon. He was the victim of a heart attack caused by overexertion, according to the Cavalier county coroner.

Born at Sauk Center, Minnesota, Dr. Strom graduated from the University of North Dakota and later attended the school of medicine at McGill University in Montreal, Quebec. After his graduation, he served with the army medical corps for two years during World War II, including eighteen months in the Philippines. He prac-

ticed at Bottineau for a short time after his discharge.

Dr. and Mrs. Strom, with their daughter, came to Langdon in 1947, when Dr. Strom was associated in the practice of the late Dr. K. P. Caveny. In March 1948 he bought the practice of Dr. J. P. Bartle, and has worked independently since that time.

Always active in community affairs, he was a member of the Langdon American Legion Post, the local Veterans of Foreign Wars post, and the Commercial Club.

He was chief of staff at the Mercy and St. Mary's hospitals in Langdon since 1953, and served as deputy health officer for Cavalier County in the Lake Region district health unit since January 1953.

O. A. KNUTSON, M.D.

Dr. O. A. Knutson, 77, physician at Buxton for nearly 50 years, died September 25, 1955, in a hospital at Grand Forks. Dr. Knutson was a guest April 24, 1955, at a special "day" in his honor.

Born at Mapleton, Minnesota, July 8, 1878, he graduated from the University of Minnesota Medical School in 1904. He had been at Dwight, North Dakota, before coming to Buxton.

In 1954, he was honored by the North Dakota State Medical Association—becoming a member of the 50-Year Club of the association and also an honorary member.

He married Clara Jacobson in September 1905. She died in 1918 and he married Esther Douglas of Gilby, North Dakota, in 1933.

Besides his wife, he leaves a son and a daughter.

SAMUEL MILLER, M.D.

Dr. Samuel Miller, 50, radiologist at the DePuy-Sorkness Clinic in Jamestown, died of a heart attack October 13, 1955, while driving his car.

Dr. Miller was born January 5, 1905, in Poland, coming to the United States at the age of 4 with his parents, who settled at Wilton and later moved to Tuttle. He attended school in Tuttle, was graduated from a Minneapolis high school and the University of Minnesota Medical School.

Dr. Miller began his practice at Medina, later became assistant superintendent of the tuberculosis sanitarium in South Dakota from 1932 to 1934, and then practiced medicine at Ellendale for several years.

He enlisted in the Army Medical Corps in October 1940 and after overseas duty was separated in 1946 as a major. Dr. Miller then attended the University of Minnesota, studying radiology. He practiced five years at Albert Lea, Minnesota, and came to the DePuy-Sorkness Clinic in December 1954.

Dr. Miller was a member of Masonic bodies at Ellendale; El Zagal Shrine of Fargo; B.P.O. Elks, the American Medical Association, American Radiological Society, North Dakota State Medical Association, and the Stutsman County Medical Society.

Surviving are his mother, Mrs. Rachel Miller, Bismarck, and two brothers.

GEORGE H. HOLT, M.D.

Dr. George H. Holt, Jamestown pioneer physician and surgeon, died suddenly December 10, 1955, after having suffered a heart attack at his home.

Dr. Holt was born September 6, 1879, in Germany. While still a child, he came to the United States with his parents who settled in Milwaukee. He attended school in Milwaukee and was graduated from Marquette University Medical School in 1908. He interned in Chicago and then went to Bismarck where he was associated with the Matchan, Roan, Holt Clinic.

In 1909, Dr. Holt moved to Jamestown to establish his private practice which he maintained since that time.

He was a member of the American Medical Association, State Medical Association, Stutsman County Medical Association, member of the staffs of both Jamestown Hospital and Trinity Hospital, member of the Jamestown Chamber of Commerce, Elks, and the Jamestown Country Club. Dr. Holt was an avid hunter and an aviation and golf enthusiast.

Dr. Holt and Mrs. Gnniel Slane were married June 18, 1951. Surviving him are his wife, one brother, and two sisters.

EDWARD G. NICHOLSON, M.D.

Dr. Edward G. Nicholson, pioneer resident of the Lawton area, died at his home in Lawton on January 20, 1956, his 80th birthday. He had practiced medicine at Lawton for fifty-three years.

Born at Almont, Ontario, January 20, 1876, Dr. Nicholson came to the United States with his parents at the age of 4 years. He studied medicine at the University of North Dakota and the University of Minnesota, later coming to Lawton, where he devoted more than a half century to care of the sick in the Lawton area.

He was married April 28, 1905, to Olive Dodge. His wife, three daughters, and two sons survive him.

CLARENCE E. LOMMEN, M.D.

Dr. Clarence E. Lommen, 72, who served the Fordville community for more than forty years, died in his sleep February 21, 1956.

Born September 28, 1883, on a farm near Crookston, Dr. Lommen grew to manhood there and attended the Crookston grade and high schools. After a year as a school teacher, he entered the University of Minnesota, graduating from the school of medicine in 1909. He spent a year as an intern in Luther Hospital, St. Paul.

He was married September 28, 1910, to Keziah Johnson of Mayville, where he practiced for a year and a half. In 1912, the couple moved to Fordville, where Dr. Lommen started his long years of service in that community.

Dr. Lommen was long an active participant in community affairs. Among his other activities, he was a member of the local Masonic and Odd Fellows lodges, served as treasurer of the school board for many years, was secretary of the fire department, retiring in January because of ill health, and served many years as president of the Fordville Commercial Club.

He is survived by five sons and one daughter.

The return on the cards sent out by the state office for "Medical Milestones of North Dakota" has not been great. It is understood, however, that three or four of the councillors have secured signatures for the purchase of this book.

E. H. BOERTH, M.D., Chairman

Committee on Legislation

The year 1955 and to date, 1956, has been totally inactive from the standpoint of the Committee on Legislation. No legislation has been brought up that might be of any consequence as far as we are concerned locally.

On the national scene, I have, as your chairman, contacted senators and other personnel in Washington, D.C., relative to the disability clause which was being attached to house bill 7225. This bill, as you know, was defeated in committee and apparently is a dead issue for another year.

As to the next legislative year in North Dakota, I am very certain of one thing and that is that the Legislative Committee will have considerable material confronting it in the new legislative year in our own legislature be-

cause of political changes which have taken place, and because of the fact that the insurgent faction NPL is now joining the Democratic ranks. One of the planks in the NPL platform calls for an expanded social security program, and this may mean a state controlled health insurance plan. Even if we have no further legislation to cope with, this shall be sufficient to alert every man in his own community in every legislative district in the state.

The second factor that the medical association should become cognizant of is the fact that the Medical Practice Act of this association is out-dated and out-moded, since no amendments or alterations have been made to this act since the year 1911. It is now reaching a point where something must be done to correct the situation. This should be brought specifically to the attention of the House of Delegates in order to see what the voice of the association is in relation to a bill of this nature in the coming legislative year.

O. W. JOHNSON, M.D., Chairman

Committee on Public Relations

The chairman, together with the president and the executive secretary of the medical association, attended a conference devoted to the necessity and the importance of public relations with regard to the medical profession. At that conference were the chairmen and the executive secretaries from practically all 48 states and territories, and two days on conferences were held in an effort to convey the meaning of public relations and its relationship to the medical profession even to the point of including the receptionist in the doctor's office.

This phase of medicine tries primarily to place the individual doctor as well as his society in a light that gives the public a working knowledge of the problems. The various other sessions with regard to the legal matters of malpractice, the medical societies handling of undesirable relations with individuals, as well as difficulties within the medical society—all of these pertinent points were discussed, and we came away with the idea that public relations is a very integral part of the practice of medicine which definitely has its effect on each and every one of us.

With regard to the state level of activities of the Public Relations Committee, the executive secretary and several members of the district medical societies attended a press conference at Minot in an effort to promote better relations with the press throughout the state. On a local level, the sixth district medical society endeavored to promote good public relations by maintaining a medical guidance booth at a local career night held in Bismarck during March.

It is my belief that in the next year definite activities must and should be directed towards acquainting the medical profession of North Dakota with the importance of good public relations.

JOHN T. CARTWRIGHT, M.D., Chairman

Committee on Official Publication

The Committee on Official Publication held no meetings during the year 1955. THE JOURNAL-LANCET was accepted at the meeting in 1955 as the official publication of our society. As there was no dissension regarding this and nothing has come up in the meantime, no meetings were deemed necessary. Should any member of the society desire any change in THE JOURNAL-LANCET in regard to publication, number of reprints given on articles, and so forth, the committee would appreciate suggestions.

G. W. TOOMEY, M.D., Chairman

Committee on Geriatrics and Rehabilitation

The Committee on Geriatrics and Rehabilitation, with Dr. T. H. Harwood as chairman, held its last meeting of the year at the Chronic Disease Hospital in Valley City on December 6, 1955. Drs. Johnson, Schoregge, MacDonald, Saxvik, Thorgrimsen, and Harwood were present. The Sheyenne Memorial Hospital was host and served dinner to the group, after which a tour of the facilities was made. The committee was quite impressed with the fine job which the hospital is doing. Following this, a meeting was held which consisted of a general discussion of the problem. It was noted that to date there exists no facility in the state of North Dakota which qualifies on all 4 counts for participation in rehabilitation as an approved program. The 4 services involved in an approvable program are those of medical services, social services, psychologic services, and prevocational evaluation and training. It was felt by most of the members that there was a general shortage of trained personnel in the fields of occupational therapy, physical therapy, and social workers.

The committee felt that its function was not too clear and would be pleased to have the House of Delegates point out to them the scope of their activities. The committee was not sure whether it should involve itself with a study of old age facilities in the state, such as official recommendations regarding what should be done concerning San Haven, or whether to re-evaluate the forms and examination blanks in use by vocational rehabilitation.

It should be noted that the suggestion was made by the Medical Center Advisory Council, that this committee might serve as an advisory committee to the projected Rehabilitation Center at the university.

T. H. HARWOOD, M.D., Chairman

Committee on Public Health

The Committee on Public Health, North Dakota State Medical Association, had no regular meeting in 1955. The following is a resume of some of the pertinent happenings in the health department:

During the spring of 1955, the National Foundation for Infantile Paralysis furnished poliomyelitis vaccine for two inoculations for first and second grade children in the state. Vaccine was furnished free and clinics were established to vaccinate all children in the first and second grades without charge to the child. In a few counties, some third and fourth grade children were eligible because of their participation in the field trials the previous year.

The present vaccination program started on October 1, 1955, and is not connected with the program conducted last spring and financed by the National Foundation. The Poliomyelitis Vaccination Assistance Act of 1955, which was to terminate on February 15, 1956, has now been extended through June 30, 1957. All polio vaccine allocated to North Dakota is being purchased by the state health department with money allocated to the state by the federal government for this purpose. The appropriation bill contained the provision that vaccine could be furnished only for the 0 to 19 age group and pregnant women. A state Poliomyelitis Advisory Committee was appointed, and the policy for the distribution of the vaccine was established by that committee. The policy established was that the vaccine should be furnished to the physicians by 8 distribution stations in the state. A list of these stations and the counties to be furnished by each station was supplied to every physician in the state. The committee also recommended that the

program be on a private patient-doctor relationship and, in certain areas where physicians decided it would be best, to hold vaccination clinics. In view of this, the state health department has not established any poliomyelitis vaccination clinics, and those that have been held are the result of the private physicians' recommendation.

At the start of the program, the age limit was between 5 and 9 years. Early in October, requests for vaccine were found to be far under the amount of vaccine which was received. Also, the early vaccine received contained a very short dating period and the expiration date of the vaccine warranted a change in priority groups. On October 11, the Poliomyelitis Advisory Committee announced the priority group should be extended to include all ages below twenty years.

To date, the state health department has received 100,245 cc. of poliomyelitis vaccine which was immediately transferred to the 8 distribution stations. The distribution stations have filled requests of private physicians insofar as the supply would permit. The vaccine is furnished free to the physicians, and the State Poliomyelitis Advisory Committee has recommended that the charge for giving the inoculations be a matter of decision between local physicians and local medical societies. Weekly reports are received in the state health department indicating the usage of the vaccine. The reports up to and including January 31, 1956, indicate that 86,341 children and expectant mothers have been vaccinated. Since January 1, the demand has increased to the point where there is not enough vaccine to fill the demands within the state, and the Advisory Committee has recommended that until a later date when the vaccine becomes more plentiful, all third inoculations be postponed. The chairman of the committee stated that it would be better to give the first 2 inoculations resulting in an 80 to 90 per cent immunity than to use the limited vaccine for a booster inoculation. If the vaccine should become more plentiful before the poliomyelitis season starts this summer, there may be a possibility that the 17,000 children who were vaccinated under the foundation program last spring will be able to receive their booster inoculations.

The last 3 allocations of vaccine to the state of North Dakota have been in very small quantities. Upon receipt of the vaccine, it has been distributed to the 8 distribution stations in accordance with the percentage of eligible population they have in their area. Orders on file in each of the distribution stations are for 20 to 30 times as much vaccine as has been received. In sending the physicians vaccine, it has been necessary for the distribution stations to prorate the vaccine in accordance with the eligible population and number of physicians in each county. Physicians in North Dakota have cooperated to the fullest extent, and it is most certainly not their fault if all eligible age groups in the state have not received Salk poliomyelitis vaccine. At the present time, there has been no indication of any large release which will meet the demand. It is hoped that within the near future, vaccine will be released by other manufacturers which would assist in getting larger quantities of vaccine into each of the states. Since October 1, approximately 90 per cent of all vaccine has been released by one pharmaceutical company.

During the past few weeks, many calls have been received by the distribution stations and in the state health department requesting large amounts of vaccine for clinics. It has been impossible to fill these requests and still maintain an equitable distribution to each county in the state. We still have approximately five months

before the poliomyelitis season starts, and as fast as vaccine is received in the state office, it will be transferred for use on the local level.

The results of the mobile x-ray survey in the state this year show a total of 37,503 with 155 positives, 135 possible tumors, 559 suspicious chests, and 704 other pathology. In North Dakota, during 1955, 146 new cases of tuberculosis were discovered. Also, in 1955, 20 cases of human brucellosis were discovered.

T. Q. BENSON, M.D., Chairman

Committee on Cancer

Cancer strikes 1 in every 4 Americans according to present statistics. Cancer today is the second cause of death in the United States. Cancer will develop in more than 40 million Americans now living if the present rates continue. Cancer strikes in approximately 2 of every 3 American families. On the average, 685 Americans die of cancer every day. Last year, 245,000 Americans died of cancer. Cancer kills 1 man, woman, or child every two minutes in this country. Approximately 80,000 Americans were saved from dying of cancer last year. If the rates continue in 1956, about 250,000 Americans will die of cancer, and more than 700,000 Americans will be under medical care for cancer. At present, of every 4 persons who get cancer, 1 will be saved and 3 will die of this disease. About one-half of the deaths from cancer in the United States are in those people under 65 years of age. More than 400,000 Americans alive are proof that cancer can be cured. The lives of some thousands of cancer patients are lost each year due to the cancer quacks. Yearly profits of cancer quacks in this country amount to about \$10,000,000. In the last forty years, the yearly death toll from cancer has risen nearly 235 per cent. In 1900, cancer was in eighth place as the leading cause of death. Today, it is the second cause of death in the United States.

The above statistics are quoted because of the fact that during the past year, an article appeared in a national magazine, the contents of which inferred that those engaged in cancer work were creating a hysteria among the people in the United States. Last year, 80,000 people, who might have been saved, died because diagnosis and/or treatment were too late. Long ago, we accepted the soundness of the theory that every one should be inoculated for smallpox. This theory has also been accepted for typhoid fever and other allied fevers, whooping cough, tetanus, diphtheria, and more recently, polio. In fact, recently people are flocking to the doctor for polio shots. We cannot classify this as a hysteria. The same applies to cancer work. Our duty is that of encouraging the patient to see a doctor early and also encouraging the doctor to detect early cancer.

Nationally, a tremendous amount of work is being done on cancer research. Last year, \$16,000,000 were allocated to different experimental laboratories throughout the United States. Among the leaders in the research work, we find: Michael Shimkin, M.D., director of the Sloan Kettering Institute of Cancer Research, working on cancer chemotherapy; Cyrus C. Erickson, M.D., professor of pathology and microbiology, University of Tennessee, presenting massive work on screening for uterine cancer by exfoliative cytology; Joseph W. Bear, M.D., professor of surgery, Duke University, working on the possible viruses in cancer, incidentally, this work has been in progress for fifty years; and Robert C. Mellors, M.D., associate and head of the section on cytochemistry, Sloan Kettering Institute of Cancer Research, working on the possibility of immune mechanisms in cancer. Most certainly, interesting informa-

tion will be presented to us in the future regarding progress in the national research program.

In North Dakota, your committee has attempted to introduce cancer education to the busy North Dakota doctor by means of kinescopes. As you know, kinescopes are films of TV programs which are available to any doctor who writes to the North Dakota Cancer Society, P. O. Box 426, Fargo, requesting a kinescope. These films are all free except for the return postage. When you mail these back, request the new low rate from your local postmaster. The following films are available: Cancer, the Problem of Early Diagnosis; Breast Cancer, the Problem of Early Diagnosis; Gastrointestinal Cancer, the Problem of Early Diagnosis; Uterine Cancer, the Problem of Early Diagnosis; The Exfoliative Cytologic Method in the Diagnosis of Gastric Cancer; The Psychological Aspects of Cancer; Lymphomas and Leukemias; Cancer of the Oral Cavity; Tumors of Childhood (to be shown during the Cancer Caravan tours); Moles and Melanomas; Cancer of the Cervix; Cancer of the Colon and Rectum; Cancer of the Central Nervous System; and Cancer of the Lung. Also, we have sent to every North Dakota doctor, a small booklet entitled "Cancer Detection in the Physician's Office." This booklet has been prepared by the Committee on Professional Education of the American Cancer Society, Massachusetts division, and approved by the Cancer Committee of the Massachusetts Medical Society. This type of booklet is being distributed to every doctor in the United States. It is well written, concise, easily read, and has plain illustrations. This is especially beneficial, as anyone in doubt concerning the type of examination he is giving his patient would have his doubts dispelled after reading this pamphlet. In the future, we will attempt to send to North Dakota doctors any useful literature we see.

The Cancer Caravan is being held this year between April 24 and May 4. This is later than usual because of the inclement weather we have encountered and also due to the late session of the North Dakota State Medical Association with the South Dakota State Medical Association meeting which is to be held June 2.

At times, it is not easy to secure adequate programs that will please everyone. In the past, we have attempted to cover cancer of the body by discussing one part of the human anatomy each year. We feel this is the only fair way in which to present this material. Because of the fact that next to accidents, the most common cause of death in children is cancer, and because of the fact that we have not covered the subject previously, we have chosen this year the topic, "Malignant Tumors in Children." Pediatric specialists from Children's Memorial Hospital, Chicago, and St. Christopher's Hospital for Children, Philadelphia, were invited to join our caravan this year. Covering the northern towns—Williston, Minot, Devils Lake, and Grand Forks will be Dr. William R. Riker of Children's Memorial Hospital, Chicago, and Dr. Joseph D. Boggs, pathologist and director of laboratories, Children's Memorial Hospital, Chicago. Both of these men have a tremendous amount of experience in pediatric pathology. We feel they are more than qualified to present this topic to us. On the southern route, including the cities of Fargo, Jamestown, Bismarck, and Dickinson, Dr. James R. Arey and Dr. George W. Pilling will be our featured speakers. Dr. Arey, a native of Minnesota, is director of laboratories at St. Christopher's Hospital and Dr. Pilling is attending surgeon. These speakers were recommended highly to us from the Scientific Committee of the American Cancer Society, and I am sure that when we hear them, we

will feel our efforts have been well rewarded. In conjunction with the Cancer Caravan this year, an afternoon public panel discussion will be held in each city. This discussion is open to the public. The panel will be composed of our guest speakers and chosen local doctors. This enables the layman to present any puzzling questions that he has in mind to the panel, which will be answered to the best of their ability. We are most grateful to Dr. Lancaster of Fargo for his work in conducting the panel in the past, and also for his organization of our panel discussion this year. At the time of writing, Dr. Lancaster has consented to accompany the Caravan and conduct the panel discussion in each city.

During the next three years, the North Dakota Cancer Society is participating with the North Dakota department of health in the mass x-ray screening program. During this program, an attempt will be made to cover the entire state, enabling everyone to receive a privilege of a chest x-ray. These x-rays will be viewed by the North Dakota Roentgenological Society for possible tuberculosis, cancer, and heart pathology.

During the past year, we have had several inquiries regarding the form for reporting cancer cases. Three years ago, we attempted to streamline the previous form, but in spite of this, we feel there is still room for more improvement. During the next year, our committee will meet with the executives of the state board of health in an attempt to further streamline this form so that in the future it will not be such a laborious task to fill out information requested. Doctors are urged to continue to report cancer cases. We feel that many of these cases are not being reported. Last year, 742 cases of cancer were reported in North Dakota.

We have been advised by the American Cancer Society that requests for grants in aid in the future must be presented to the Scientific Committee of the American Cancer Society, who in turn will pass upon the advisability of granting funds for research. The reason for this is that the past several projects throughout the country have been duplicated. They feel that by grant emanating from one office, duplication will be prevented. During the past, the North Dakota Cancer Society has awarded a total of approximately \$100,000 to research work at the University of North Dakota, Grand Forks, and the North Dakota State College at Fargo. We encourage this type of research and will do everything possible to aid research workers in obtaining grants in aid.

Doctors are encouraged to cooperate with the local county commanders of the North Dakota Cancer Society by being available for short talks and conferences when requested. Much information is obtained from our local office; forms are available from which to prepare cancer speeches. These are all short and very nicely arranged so that very little preparation is needed prior to giving a talk. The work is also enjoyable and helps to bring the patient with cancer problems to the doctor before it is too late. The goal for North Dakota this year is \$100,000.

In 1957, our efforts will be concentrated on cancer quackery. Thousands of lives are lost each year due to cancer quacks. Millions of dollars are pouring into their pockets. Legislation against cancer quackery will be our goal. This will be difficult, but we are going to try to initiate legislation that will place the cancer patient in safe hands.

At the time of this writing, the food and drug administration attacked the work of Harry M. Hoxsey in a document being published in the Federal Register and warning the public against the cancer cure. We have

requested an exhibit on cancer quacks for our 1957 state medical meeting, which is a very attractive display. We will write you individually about this exhibit.

The North Dakota Committee on Cancer wishes to thank all doctors in this state who have and are participating in our program. We appreciate the unselfish way they have given their time and efforts on our behalf.

CARROLL LUND, M.D., Chairman

Committee on Nursing Education

There was no called, formal meeting of the Committee on Nursing Education for the year 1955-1956, because no business or activity seemed to demand such action. Continued contact with the executive office of the North Dakota State Nurses Association has been maintained in the event that consultation with the medical profession should be desired or if some problem should arise requiring joint action by both groups. It is believed that a congenial and cooperative spirit exists between the North Dakota State Medical and Nurses Associations.

At the medical convention in Bismarck in the spring of 1955, the Nurses Association had a booth for consultation and discussion of problems with the medical profession. The nurses served coffee at another booth. It was the opinion of most everyone that the innovation of these courtesy booths was worthwhile and constructively offered promises of accomplishments. Because of the joint meeting in Aberdeen, South Dakota, the North Dakota State Nurses Association does not plan on similar booths this year. They are looking forward to the 1957 North Dakota State medical convention, when once again they may be represented.

Nurse recruitment, army nurse corps, nursing careers, and other activities of nursing have been reviewed with the executive officers of the North Dakota State Nurses Association.

C. A. ARNESON, M.D., Chairman

Committee on Maternal and Child Welfare

The Maternity and Child Welfare Committee met in Jamestown in August 1955. At that time, we suggested a list of names to be presented to the North Dakota Obstetrics and Gynecology Society as possible coordinators for the maternal mortality survey. The society, in turn, nominated 3 men and, of these, Dr. Halliday picked Dr. John Moore of Grand Forks for this position.

At the same time, we suggested the names of 3 men from Grand Forks, Fargo, Minot, Dickinson, and Bismarck to be used as investigators for maternal deaths. The coordinator picked 1 man as the investigator and 1 as an alternate for these areas.

We also suggested that each medical society district nominate 1 man to serve as the review board for the maternal deaths.

Our committee is very proud of the cooperation between the Obstetrics and Gynecology Society, the physicians of the state, and the committee. All maternal deaths for 1955 have been investigated and most of them are abstracted and will soon be ready for the review board.

Our committee held another meeting in Fargo on March 22 and submit the following for consideration:

1. We recommend that the death certificates of all women between the ages of 15 and 45 be cross matched with birth and stillborn certificates. In this way, a closer check can be made for maternal deaths in our state.

2. We recommend that if and when a Poison Control Center is established in Fargo, all physicians participate in using its facilities to decrease the deaths of infants from accidental poisoning.

3. We are satisfied with the success of the polio vaccine which we recommended in our last report but are disappointed with the lack of the vaccine.

ROBERT E. LUCY, M.D., Chairman

Committee on Crippled Children

The meeting of the Committee on Crippled Children was held at the Gardner Hotel, Fargo, December 10, 1955, and was called to order at 9:15 A.M. by the chairman, L. G. Pray, M.D. Members of the committee present were: Dr. L. G. Pray, Fargo, chairman; Dr. A. E. Culmer, Jr., Grand Forks; Dr. Paul Johnson, Bismarck; Dr. Douglas Lindsay, Fargo; Dr. J. C. Swanson, Fargo; Dr. B. A. Mazur, Fargo; Dr. H. J. Fortin, Fargo; Dr. C. G. Johnson, Rugby; and Dr. C. W. Hogan, Jamestown.

Others present were: Dr. D. J. Halliday, Kenmare, president, North Dakota State Medical Association; and Lyle A. Limond, Bismarck, executive secretary, North Dakota State Medical Association.

Mr. Lyle A. Limond, acting as secretary for the meeting, read the report of the committee meeting for the previous year. The report of the committee as approved and adopted by the House of Delegates of the state medical association was as follows with the following points emphasized and recommended: (1) An attempt be made to secure funds from benevolent organizations for children suffering from rheumatic heart disease, epilepsy, and possibly other crippling conditions. (2) More education be given the public regarding various crippling conditions through the media of television, radio, and the public forum. 3. A paper on epilepsy and its treatment be given every few years at the annual meeting of the North Dakota State Medical Association as part of its program of informing the profession more adequately concerning this disease.

Dr. Paul Johnson, medical director of the Crippled Children's Services of the Public Welfare Board of North Dakota and a member of this committee discussed the work of the Special Advisory Committee to the Crippled Children's Services. He stated that at a meeting of the advisory committee on September 17, 1955, fees for certain procedures were discussed, plus giving approval to certain physicians and dentists for the care of crippled children. The blood bank situation was also discussed. Dr. Johnson disclosed that the University of Minnesota and the Mayo Clinic can now match and possibly surpass the efforts of the center in Chicago in caring for children suffering from congenital heart conditions. Because of this no children from North Dakota are being sent to the Chicago center at the present time. The membership of the state medical association are to be informed that the Minnesota plan is now in effect. Dr. Johnson also stated that the Petroleum Wives Club of Bismarck had donated over \$10,000 during 1954-1955 to Camp Grassick.

Dr. Pray reported that the Cerebral Palsy Clinic held in Grand Forks during November 1955 was successful in spite of inclement weather. He went on to state that the referrals for this clinic were fairly adequate as to numbers but not quite enough to give a choice of interesting and valuable cases. Greater interest must be stimulated among the physicians in North Dakota in regard to the Cerebral Palsy Clinic if it is to be continued successfully. It was stated that the use of the Crippled Children's Services files in Bismarck on children suffering from cerebral palsy could be used as a resource file for the 1956 clinic.

A request from the Easter Seal Society (North Dakota Society for Crippled Children and Adults) that this

committee act in an advisory capacity to that organization was discussed. After favorable discussion a motion was made by Dr. Culmer, seconded by Dr. Lindsay that the Committee on Crippled Children serve as a medical advisory committee to the North Dakota Society for Crippled Children and Adults. This motion was carried unanimously.

The Opportunity School for Handicapped Children in Fargo was mentioned by Dr. Pray. This school is for children between the ages of 4 and 9 years, some of whom are physically handicapped and some mentally retarded. This is a private enterprise sponsored by interested local people. All children entering the school are admitted on the recommendation of physicians. They are taught school subjects in accordance with their ability, and they also have the benefit of speech therapy and occupational therapy in cases in which these facilities are indicated. The North Dakota Society for Crippled Children and Adults has contributed \$1,500 toward the operation of this school during the past year and also acts in an advisory capacity. A professional advisory committee consisting of local physicians has been instrumental in the operation of this school.

Dr. Swanson raised a question with regard to muscular dystrophy, concerning whether or not such cases are eligible for care under the Crippled Children's Services. Dr. Johnson replied that such cases can be paid for when surgery or physical therapy would be of benefit.

L. G. PRAY, M.D., Chairman

Dr. J. D. Craven moved that the reports of the Committee on Medical Economics and the Sub-Committees be referred to Reference Committee No. 5. Dr. T. E. Pederson seconded the motion and it carried.

Dr. Jaehning moved that the report of the Committee on Constitution and Bylaws be referred to Reference Committee No. 7. Dr. Boynton seconded the motion and it carried.

Committee on Medical Economics

The Medical Economics Committee had no need for a special meeting during the past year. The situation with the different organizations, such as the State Welfare Board, the Workmen's Compensation Bureau, and the Veterans Administration has been going along without too many flaws.

The Welfare Board fee schedule has been observed by nearly all of the doctors in the state and has proved satisfactory to date. Two or three doctors have been reported to have charged more than the schedule called for, but these conditions have been corrected with the doctors involved during the past year.

It is felt by some members of this committee that a revision of the fee schedule with the Workmen's Compensation Bureau should be undertaken this coming year. A few doctors feel that there has been too much delay in payment of Workmen's Compensation cases, and that too many cases have been needlessly sent out of state for treatment that could have been performed within the state. These conditions should be taken up with the Workmen's Compensation Bureau during the coming year.

The Veterans Administration has changed their arrangement with the state medical association so that authorizations for work will now come directly from the Veterans Administration offices in Fargo rather than through the state medical association office. This arrangement has been working out satisfactorily; however, it is felt by some of the members of the state association that the fees involved are probably not up to what

they should be as compared to a private fee schedule.

It is my impression that a meeting of the Medical Economics Committee should be held within the near future to determine what work needs to be done by this committee in the coming year and what revision should be undertaken of the work that has already been done.

TED KELLER, M.D., Chairman

Sub-Committee on Veterans Medical Service

This committee has not held a meeting. No problems have been presented to this committee up to this time and, consequently, it is assumed that all veteran activities are functioning at a smooth and satisfactory level.

A. C. FORTNEY, M.D., Chairman

Committee on Prepayment Medical Care

The Committee on Prepayment Medical Care met at the Gardner Hotel in Fargo on December 11, 1955, and was well attended.

The initial discussion regarded the association's Disability Insurance Plan, now carried with the Metropolitan Casualty Insurance Company of New York. We were informed by the local agent, Mrs. Elizabeth Shepler of Valley City, North Dakota, that between 185 and 200 members of the North Dakota State Medical Association are now enrolled. It was moved by Dr. W. E. G. Lancaster of Fargo, a member of the committee, that Mrs. Shepler give us an over-all picture of the plan, plus securing from her reports every three or four months concerning the number covered, as well as members' names. This motion was seconded by Dr. V. J. Fischer of Minot and carried.

Discussion was then initiated regarding the possibility of an association plan for life insurance for its members. The Oklahoma State Medical Association plan was discussed in detail. It was moved by Dr. T. E. Pederson of Jamestown that the committee make a further study of this plan with the thought in mind of informing members of the North Dakota State Medical Association, through the House of Delegates, if such a plan might be available if so desired. Such a plan would have many advantages as group insurance, such as waiver of physical examination, and at a cost that would be lower than most insurance plans and that would cover those members of the association that might now not be insurable. Dr. V. J. Fischer of Minot seconded this motion and it was carried.

The Oklahoma State Medical Association's malpractice insurance policy was then discussed as it might apply and be applicable to the profession in North Dakota. The committee members, after discussion, felt that by having coverage in one company, it might bring lower premium rates, plus better service. If such a plan were feasible and would meet with the approval of the membership, it might well decrease the possibility of malpractice suits in the future. Therefore, it was moved by Dr. Charles Porter of Grand Forks that the committee survey the malpractice plans and that the membership of the association be polled as to whether or not they might desire to attempt such a plan. The motion was seconded by Dr. F. DeCesare of Fargo and carried.

The committee next discussed the use and abuse of all prepayment medical plans in North Dakota per instructions of the House of Delegates at the last session. It was moved by Dr. Ellis Oster of Ellendale that the committee hold back on the survey until the results from the A.M.A.'s Commission on Medical Care Plans are known. This motion was seconded by Dr. W. E. G. Lancaster of Fargo and carried. It was further moved by

Dr. Frank DeCesare of Fargo that the committee direct or suggest an educational program from the state office in which association members are to be alerted to the necessity of prepaid medical coverage and also to the need for an awareness on their part concerning use and abuse that may be extant in North Dakota. This motion was seconded by Dr. Charles Porter and carried.

The state office surveyed our membership regarding an association plan for professional liability insurance. Of the 250 returned postal cards, 160 indicated that they were in favor of an association plan for malpractice insurance coverage. Many added comments stating that they wanted lower premiums but also that the full Medical Economics Committee should study the plan very carefully from all angles.

In a reply received from the agent of the Metropolitan Casualty Insurance Company of New York, it was stated that 160 members are covered. The amount of claims paid from March 1, 1955 to March 1, 1956 was \$6,016.44. From the company's viewpoint, this is considered very good. Another open enrollment program was planned for April 15 or May 1 of 1956. This would include new long-term benefits as follows:

For accidents: pays up to LIFETIME for continuous total disability.

For sickness: Seven years nonconfining plus DOUBLE BENEFITS for confining sickness from the third through the fifth year.

Extended from a maximum sickness benefits under one disability of \$27,350 to a possible maximum sickness benefits for the seven years \$52,000. Brochures, and so forth, will be forwarded when this enrollment is open.

Our agent, Mrs. E. A. Shepler, will send us quarterly reports as requested by this committee.

C. H. PETERS, M.D., Chairman

Committee on Rural Health

In August, your chairman and Lyle A. Limond met Aubrey Gates, A.M.A. field director of Rural Health Committee, for eight hours and learned what is being done throughout the nation and gained some ideas as to what can be done.

The committee held one meeting at Fargo, December 10, 1955. The following members were present: Dr. K. G. Vandergon, Chairman, Portland; Dr. S. C. Bacheller, Enderlin; Dr. L. T. Longmire, Devils Lake; and Dr. D. J. Halliday, Kenmare.

This meeting was mainly devoted to trying, in some way, to set up a program in Rural Health Education that all doctors could participate in. It was finally decided to attempt to set up Immunization Booths staffed by physicians of each of the district societies at each of the fairs in the summer of 1956. It was felt that we could better reach a segment of the population which has not had immunization and perform a public service and public relations activity at the same time.

Your chairman, Dr. W. A. Wright, and Lyle A. Limond attended the National Rural Health Conference at Portland, Oregon, March 8, 9, and 10, 1956. This very informative meeting stressed the "Family Physician." On March 23, 1956, Lyle A. Limond and your chairman reported on this conference to the North Dakota Public Health Association annual meeting at Bismarck.

We hope that next fall we will have reports from the district societies on the success of their immunization program and that we will reach a large segment of the North Dakota population.

KEITH G. VANDERGON, M.D., Chairman

Liaison Committee to the North Dakota Bar Association

This committee has not met since the last meeting of the House of Delegates.

The House of Delegates, at its 1955 session, suggested that the bar association and the medical association hold joint meetings in the several councillor districts.

However, the consensus of all concerned apparently was that a joint statewide meeting of both associations would be adequate as an initial start on this program of cooperation and mutual understanding of each other's problems.

Therefore, a meeting was held in Grand Forks on the campus of the University of North Dakota on December 2 and 3, 1955. This two-day meeting was well attended by the members of both associations. Their mutual problems were emphasized and discussed, which resulted in a much better understanding by all.

The work and planning, as far as the medical association was concerned, was very ably handled by Dr. Alan K. Johnson of Williston, and Dr. T. H. Harwood, dean, School of Medicine, University of North Dakota.

Another meeting of the two associations is planned for the fall of 1956.

C. H. PETERS, M.D., Chairman

Report of Representative to the Governor's State Health Planning Committee

Since your representative was appointed to this committee, 1 meeting was held on October 25, 1955.

One of this committee's chief functions is to act as an advisory committee to the state department of health in allocating federal funds received under public laws 725 and 482 to aid in construction of hospitals and other medical facilities in the state. Under the so-called regular program (public law 725) funds are received for the following categories: general, mental, chronic, tuberculosis hospitals, and public health centers. Under the amended program (public law 482) funds are received for the following categories: hospitals for the chronically ill, diagnostic and treatment centers, nursing homes, and rehabilitation facilities. Funds received under public law 482 can be interchanged between the first 3 categories mentioned above, providing that no bona fide application for funds are received under the specific categories. Funds received for rehabilitation facilities, however, cannot be diverted to other uses. At the October 25, 1955, meeting the following 5 projects were given preliminary recommendation to receive aid from these various funds as follows:

1. A 43-bed chronic disease unit as part of an addition to Trinity Hospital at Minot.

2. An 80-bed nursing home to be located at Bismarck and operated by the Sacred Heart Benedictine Convent and Academy of Minot.

3. A 72-bed nursing home to be located at Dickinson and operated through the board of charities of the Evangelical and American Lutheran churches.

4. A 100-bed nursing home to be located at Fargo and operated by the Lutheran Hospitals and Home Society, Inc.

5. A combined rehabilitation, and diagnostic and treatment center to be located at the University of North Dakota at Grand Forks as a part of the medical center.

During the discussions regarding the various requests for nursing homes, it was brought out that existing federal regulations did not allow the construction of a nursing home as an integral part of an existing domiciliary institution (old people's home or other similar institution). They must be free standing buildings and

are subject to regulations regarding type of construction, floor space, and various sanitary and safety precautions.

The state Health Planning Committee was of the opinion that this was a handicap in this state and that some nursing home funds might be better utilized if federal regulations for nursing home funds allowed their construction in association with established old people's homes which meet requirements. Recommendations to this effect were conveyed to the United States Public Health Service and to our congressmen and senators. Recent information received by the state department of health indicates that this regulation has been eliminated. Federal participation in the cost of constructing nursing homes attached to homes for the aged is now permitted, providing the nursing unit meets the definition of a nursing home according to federal regulations and conforms to certain other requirements.

The state Health Planning Committee feels at present that very few, if any, new hospitals are needed in new locations throughout the state but that a number of out-moded structures should be replaced and others should be renovated. Also, more nursing home type of facilities are believed needed. Accordingly, as far as your representative knows, no new locations for hospitals are under active consideration, but requests for consideration were received for an addition to a general hospital in Ellendale, for completion of a general hospital under construction at Hebron, for the replacement of a general hospital in Mandan, for construction of a neuropsychiatric facility by the North Dakota Neuropsychiatric Institute at Fargo, and for construction of a nurses training center and residence at St. Luke's Hospital in Fargo. None of these programs appeared to be in a stage where specific action could be taken under the rules the committee has adopted.

The regulations of the federal agencies, the policy and regulations of the North Dakota state department of health, and the policy of the state Health Planning Committee frequently require interpretation concerning their effect on a particular project. Accordingly, we strongly urge communities contemplating a request for funds under these programs to obtain advice from Mr. Arnold Goplen, director of the division of hospitals of the state department of health, at an early stage in their planning.

Your representative expects to attend the meeting at Aberdeen and be available to the Reference Committee for questioning or clarification if desired by the committee.

P. H. WOUTAT, M.D., Representative

Liaison Committee to the North Dakota Hospital Association

The Liaison Committee of the North Dakota State Medical Association and the North Dakota Hospital Association held its first and only meeting on August 12, 1955. Members of the committee present were: Dr. K. E. Fritzell, Arne G. Bjorke, Leonard H. Egstrom, and Dr. Russell O. Saxvik. Others in attendance were: Dr. P. H. Woutat, Dr. O. A. Sedlak, Lyle A. Limond, and Gene S. Bakke.

An agenda for general discussion was discussed: (1) study of hospital admission, (2) minimum provisions in a prepayment contract, (3) relationship between Blue Cross and Blue Shield, (4) hospital representation on the Blue Shield board, and (5) formation of a liaison committee between Blue Cross and Blue Shield.

The discussion basically considered the purpose and functions of the Liaison Committee. It was the opinion of the committee that any special problem arising between doctors and hospitals should be first considered

by a regularly constituted committee or council within the 2 organizations. The committee was further of the opinion that if the official board or council of either of the organizations directed a problem to the Liaison Committee, it would function best as purely an advisory or technical committee.

It was strongly felt that the Liaison Committee should not become a power committee or in any way infringe upon the duties or responsibilities of other official committees, board, or council within the two organizations. Although many items were discussed, they all led to the desirability of having the official boards or council of both organizations crystalize the purpose and functions of the Liaison Committee.

R. O. SAXVIK, M.D., Chairman

Committee on School Health

No meeting was held this year; hence no constructive program has been adopted as a whole by this committee for recommendation to the state medical association. However, the school health lectures were given at 4 of the 5 Teachers' Colleges last summer.

O. W. JOHNSON, M.D., Chairman

Committee on Constitution and By-Laws

A preliminary report was given on the revision of the Constitution and Bylaws to the council of the state society at the midwinter meeting in December 1955. Since that time, the proposed revisions have been forwarded to officers and councillors of the state association for further suggestions. Many of these suggestions have been incorporated in the copy of the original proposed revisions which will be presented to the proper Reference Committee of the House in Aberdeen.

It is suggested that the revisions of both the Constitution and Bylaws be put into effect immediately, if the House of Delegates accepts the proposed revisions, and that a new book be printed. It is further suggested, if they are accepted in their entirety, that this committee be dissolved.

ROBERT B. RADL, M.D., Chairman

Speaker Dodds, at this time, followed a practice inaugurated last year by the House, by introducing Mrs. James Mahoney, president of the Woman's Auxiliary, who gave her report as follows:

Doctor Dodds, members of the House of Delegates, and guests: I started my term of office by attending the National Convention in Atlantic City last June, where one of the speakers told about the Negro preacher who said as he got up to give his sermon, "Lord, fill mah mouth with worthwhile stuff, and nudge me when I've said enuf!"—which is pretty much the way I feel as I stand before this august group. At the end of my report at Atlantic City, I gave this little poem:

*"We may not be the biggest—we may not have the most—
But when it comes to enthusiasm, we really can boast!
Our land may be treeless—our weather most cold—
But our faith in the future makes us hardy and bold!
On our windswept prairies, we live clean and free—
Ours is a land of unlimited opportunity!
So don't sell us short 'cause we're small and we're young—
Just look to your laurels—we've only just begun!"*

Then we came home to attempt to put this threat into action and throughout this year, I do feel that we have made progress in all our fields of endeavor. Our membership has increased from 295 to 307. Our largest project was again our sophomore medical student loan fund, for which we raised \$2,490.30, making a total of \$10,430.54 contributed to this fund since its instigation in 1951. During this time, 15 boys, not including the present year, have been helped by loans of approximately

\$500. Dean Harwood favored us with a very complimentary letter of appreciation on the part of the University on our outstanding work on this project.

We have been very active with letters and telegrams to Washington, opposing the disability clause of social security amendment, H.R. 7225, as well as other legislation to the interest of the medical profession.

Several of our district auxiliaries have shown films on nurse recruitment—one has established a highly successful future nurses club. Our A.M.E.F. contribution increased from \$41 last year to \$138 solely through the use of memorial cards.

We have succeeded in putting *Today's Health* in our own doctor's offices, as well as being instrumental in having one district society donate subscriptions to the schools and libraries. In cities where there are filter centers, our members have been active as sky watchers.

Perhaps our largest activity, although not entirely as a group, has been individually in public relations. With the state theme for the year, "Be an Informed Auxiliary," and the national one, "Active Leadership in Community Health," our members have gone into their other organizations with authentic health information and been active in all the related groups, such as Red Cross, Polio Foundation, Cancer Society, American Legion Auxiliary, PTA's, and many others.

So you can see, our activities in a large part parallel the interests of your society, as well they should. I quote from our latest handbook: "Auxiliaries are not independent organizations, but rather a part of the American Medical Association and its constituent societies." It is my feeling that more could be accomplished in both our organizations if we were to work more closely together on both the state and district level. According to our constitution, we are to have a board of trustees for the state auxiliary from your group, with its chairman as our special advisor, and each district is to have a board of directors consisting of 3 members. If these were properly set up, so that our district presidents, as well as state officers could confer with them on the projects to be accomplished, we might work them out together, and I am sure we could be of a great deal more service.

Another step in this direction, it seems to me, would be to include the wives' dues in the bill sent to the doctor for his. This would not only help to increase our membership, but also perhaps make the doctors a little more interested in their wives' activities. This is a suggestion I would like very much to have your group consider seriously.

Our auxiliary has also been active in the field of mental health—birthday parties have been given at the State Hospital; magazines have been sent to both the Jamestown Hospital and the Grafton school. I have left this subject till last because at the conference of state presidents and presidents-elect in Chicago last fall, I was on the mental health panel, and I thought perhaps you might be interested in hearing what I said at that time as your representative. My subject was: "What we, as Individuals, Can do to Help our State and Local Mental Health Programs." I said: "Perhaps the best place to begin on this problem is in our own backyards, so to speak. We can hardly expect to help others until we have our own mental houses in order. There is a parody, 'Blessed are those who go around in circles, for they shall be called Big Wheels.' But instead of going around in circles, maybe if we start in the center of an ever-widening circle, our own homes, and work outward, we can do more individually toward better mental health. Anyway, in our little spheres, we are really just the

woman behind the Big Wheel. Our husbands are in a delicate profession; they deal with life and death. So it is important for us to furnish in their home life a serenity and even keel that will enable them to better evaluate this intricate balance. Certainly a doctor's home with its ever-vacillating schedule is the hardest place to do this, and, although the doctor's wife is often pictured as a disgruntled, harassed, meal-waiting soul, my feeling is that most of us recognize that the advantages greatly outweigh the disadvantages, and we pretty much take the irritations in our stride. As the backseat driver, too, perhaps we can help steer our husbands into the realization that people want to be treated as human beings, and much of our mental illness can be prevented before it begins, if doctors have the patience and understanding to listen. Often a person's biggest problem is living with himself, and most of all he wants to talk to someone about it. So let us urge our husbands to recognize people as persons—and listen—and also to remember the great theme stressed by Doctor Hess—that there is another Force influencing a patient's progress, in addition to the many wonder drugs and doctors' skills, helping or aggravating him, whichever our Maker sees fit. I'm sure we have all said many prayers for our husband's particularly precarious cases, and it might be well to remind our doctors of the aid furnished by this source.

As our circle widens, and we look into our community, we must realize that mental health is not only concerned with those condemned to an institution, but with the day-to-day living of all of us—our families, our friends, and neighbors. As individuals, we can evaluate the needs of our community to create a healthy, happy atmosphere for its residents. As leaders, we can do something about it.

Also, we can educate the public to the fact that mental illness is a form of sickness and is not to be looked upon as a stigma, and a recovered mental patient needs especially to be treated the same as anyone who has recovered from a physical ailment when he returns to society.

So, if we keep home and husband happy,

Surely we will find

'Twill reach out to others and make them healthier in mind.

It takes charity, patience,

And understanding, too.

But, we can't miss, for after all, it's just the Golden Rule!

Thank you."

NEW BUSINESS

The next order of business consisted of fixing the per capita dues for the ensuing year. There was no request for increased expenditures after the council went over the budget; therefore, the dues would remain the same, \$75 for the next year, if agreeable to the House. The Chair entertained a motion that the per capita dues remain at \$75.

Dr. Peters made the motion, seconded by Dr. Boynton, that the per capita dues remain at \$75. Motion carried.

At this time, Lyle A. Limond, executive secretary, North Dakota State Medical Association, introduced Mr. Diers, representative of the association's insurance plan, who gave his report.

Speaker Dodds requested that Dr. Baumgartner, chairman of Reference Committee No. 5, be contacted if there were any observations or recommendations on Mr. Dier's report.

Dr. Boerth next read the names of the doctors, whom the president had appointed to the Nominating Committee. These were: Dr. C. J. Glaspel, chairman; Dr. Joseph Sorkness, and Dr. V. J. Fischer.

Speaker Dodds next asked for any new business which should come before the House. Dr. Fawcett had one

short communication from the council, which was in the form of a resolution, passed by them, as follows:

Whereas, the Woman's Auxiliary of the North Dakota State Medical Association has, through various projects entailing continuous work and effort, raised a sum of approximately \$10,000 for their medical student loan fund at the medical school of the University of North Dakota; and

Whereas, this fund has been of inestimable value to many medical students and to the medical school;

Now, therefore, be it resolved, that the council of the North Dakota State Medical Association convey to the Woman's Auxil-

iary of the state association their appreciation and thanks for this splendid project.

J. C. FAWCETT, M.D., Chairman

ADJOURNMENT

There being no further new business to come before the House, it was moved and seconded that the first session of the House of Delegates adjourn to reconvene at 2:00 p.m. Sunday, June 3.

TO BE CONTINUED IN OCTOBER

Lancet Editorial

A Letter of Appreciation

WE TAKE PLEASURE in presenting as an editorial the following letter to Dr. D. J. Halliday from Dr. Hart E. Van Riper, medical director of the National Foundation for Infantile Paralysis. Dr. Halliday is the retiring president of the North Dakota State Medical Association.

Dear Dr. Halliday:

May I take this opportunity to express thanks from the National Foundation for Infantile Paralysis to the North Dakota State Medical Association as a whole and to its individual members for their excellent cooperation with the state health department and the National Foundation in the successful conduct of the poliomyelitis vaccine program in North Dakota during 1955.

The chief beneficiaries of this program, of course, were the North Dakota school children, for the most part in the first and second grades, who received 1 or more injections of vaccine supplied by the National Foundation. A total of 38,445 cc. of vaccine was supplied.

You may be interested to know that, thanks to your help, 17,882 North Dakota children received at least 1 inoculation; 17,037 received 2 inoculations; and 1,049 received a booster inoculation up to December 6, 1955.

Approximately 28 per cent of the North Dakota children in the 5 to 9 age group, the group most susceptible to paralytic poliomyelitis, thus obtained a high degree of protection against the disease in 1955 as a result of this program.

The cooperation of the North Dakota State Medical Association helped materially to account for this fine record.

While this is a formal expression of gratitude for your help, the real expression must come from the parents of those many children in North Dakota who feel their families are free from the threat of paralytic poliomyelitis during this 1956 poliomyelitis season.

Very cordially yours,
HART E. VAN RIPER, M.D.
Medical Director

American College Health Association News . . .

Dr. Dana L. Farnsworth, director of the Harvard University Health Service, has announced that a library on student health is being developed in the John Peabody Monks Room in the Harvard Health Center. This room was given by friends of Dr. Monks. The library to be developed in it, and now partly organized, will contain a considerable number of volumes from Dr. Monks' own personal library as well as a collection of books, journals, reprints, and other items that will be of aid to any investigator working in the field of the promotion of college health.

Dr. Farnsworth would especially like to have copies of articles or books on any phase of student health that have been written by past and present members of the American College Health Association. If members will send such material to the library, it will be properly organized, catalogued, and bound, thus being available to any responsible person who may wish to use the collection for research or other purposes.

Address: The John Peabody Monks Room, Harvard University, 15 Holyoke Street, Cambridge 38, Massachusetts.

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Dr. Robert Stoltz has been appointed director of the Student Health Service at Valparaiso University, Val-

paraiso, Indiana. Dr. Stoltz was the university physician the past year.

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Dr. Edwin F. McNichols has been named director of the University Health Service, DePauw University, Greencastle, Indiana. Dr. Lawrence Riggs, dean of students, states that Dr. McNichols is completing his residency in internal medicine at the Kennedy Veterans Group Teaching Hospital, Memphis, Tennessee, and will assume his duties as director at the completion of his formal training in September 1956.

Notice has been received of the death of Dr. Harvey Spencer, associate psychiatrist in the Health Service at the University of Michigan in Ann Arbor. Dr. Spencer died July 11, 1956, in Massachusetts General Hospital after surgery.

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Notice has been received in this office of positions available for physicians in student health work at Alabama Polytechnic Institute and at Tulane University.

Those interested should contact: Morgan W. Brown, M.D., director of Student Health, Alabama Polytechnic Institute, Auburn, Alabama; or Dr. John H. Stibbs, dean, Tulane University, New Orleans 18, Louisiana.



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News Briefs . . .

North Dakota

CAPITAL CITY CLINIC at Bismarck, formed and operated by Drs. R. W. Henderson, M. W. Goughnour, and A. C. Orr, was recently completed. The new quarters, 140 by 25 ft., include examination rooms at either end with the business office in the center. The new clinic boasts of the most modern x-ray and laboratory facilities.

DR. KENT E. DARROW and DR. WILLIAM H. LONG, founders of the Dakota Clinic at Fargo, were honored recently at a dinner marking the clinic's thirtieth year of operation.

DR. OTTO C. MAERCKLEIN was honored recently by the residents of Mott in recognition of his forty years of service to the community. A highlight of the program was the main address presented by Dr. R. W. Rodgers of Dickinson, president-elect of the North Dakota Medical Association.

DR. A. K. LOMMEN, who interned at St. Luke's Hospital, Fargo, has become associated with Dr. P. L. Blumenthal and Dr. J. F. Harrington at the clinic in Mandan.

DR. JAMES KRESS is the new surgeon at the Garrison Clinic and Hospital. For the past four years, Dr. Kress was a resident in surgery at the Ochsner Clinic in New Orleans, Louisiana.

DR. HANS KUISK and DR. W. EDWARD JORDAN have recently joined the staff of the Fargo Veterans Administra-

tion Center. Dr. Kuisk is a former Estonian refugee who has practiced in Rutland, North Dakota, since 1951. Dr. Jordan, formerly served a three-year surgical residency at Veterans Administration Hospital, White River Junction, Vermont, and Dartmouth Medical Center, Hanover, New Hampshire.

Minnesota

PINE COUNTY MEMORIAL HOSPITAL at Sandstone, cost of which exceeded \$435,000, was dedicated recently. Plans and efforts to build such a hospital began many years ago, but construction was not begun until April 1955. The building is unsurpassed by any hospital in the state for safety, low cost of maintenance, and efficiency.

CONSTRUCTION of a new wing of Elizabeth Kenny Institute was begun late in June. The \$1,500,000 addition will provide rehabilitation, medical research, and laboratory facilities. Cost will be met by a grant from the Sister Elizabeth Kenny Foundation, the federal government through Hill-Burton funds, and the Ford Foundation.

DR. ANCEL KEYS, head of the department of physiological hygiene at the University of Minnesota and noted for research in heart disease, has left for Moscow with Dr. Paul Dudley White and 3 other American scientists. Invited by the Soviet Ministry of Health, they will discuss heart disease and allied ailments while in Moscow.

GRANTS-IN-AID amounting to \$54,940 for heart research have been awarded to 10 Minnesota scientists under a joint program of the American and Minnesota Heart

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Associations. Recipients are: Drs. Ellis S. Benson, Henry M. Cavert, Richard A. DeWalt, Robert A. Good, Ancel Keys, Richard T. Smith, Henry L. Taylor, Louis Tobian, and Richard VonKorff, all of the University of Minnesota, and R. David Nelson, Bethel College, St. Paul.

DR. HERMAN J. MOERSCH, chairman of two sections of medicine concerned with diseases of the chest at the Mayo Clinic and professor of medicine in the Mayo Foundation Graduate School, was elected president of the American College of Chest Physicians at the organization's annual meeting in Chicago.

DR. ROBERT L. PARKER, associate professor of medicine in the Mayo Foundation, has been elected president of the Minnesota Heart Association. Other officers include: Dr. Milton Hurwitz and Herbert F. Mischke, St. Paul, vice presidents; Dr. Karl Anderson, Minneapolis, secretary; and Bernard B. Knopp, Mahomet, treasurer.

DR. RICHARD L. CONDE, a psychiatrist recently discharged from the army medical corps at Ft. Carson, Colorado, has been appointed clinical director of the Anoka State Hospital.

DR. JOSEPH E. MARVIN, specialist in obstetrics and gynecology, has joined the staff of the North Central Medical Center at Brainerd.

South Dakota

THE BROWN CLINIC at Watertown, which has outgrown its present quarters, will move into the former Schaller house sometime during the summer of 1957. Extensive remodeling of the interior and exterior is planned, and work is expected to start this fall.

DR. J. C. OHLMACHER, Vermillion, received the distinguished service award of the South Dakota State Medical Association at the meeting of the North and South Dakota Associations. The award is the highest honor that South Dakota physicians can bestow upon a member of their association.

DR. VALENTINE C. MAIRI, of the McLaughlin Clinic, recently attended a two-week course in Surgical Technique at Cook County Graduate School of Medicine, Chicago.

Deaths . . .

DR. HENRY L. HALVERSON, 76, for many years a physician and surgeon in Des Laes and Minot, North Dakota, died June 6. Dr. Halverson was past president of the North Dakota Health Officers Association.

DR. AUGUST C. TINGDALE, 83, Minneapolis physician and surgeon, died June 5. Dr. Tingdale had been a member of the Deaconess Hospital Staff and physician for the Ebenezer Home.

DR. A. V. GARLOCK, 71, a physician in Bemidji, Minnesota, since 1914, died of a heart condition June 25. A former mayor of Bemidji, Dr. Garlock was long known as a civic leader as well as physician.

DR. FLOYD D. GILLIS, 68, who, as president of the South Dakota State Medical Association, was to have presided at the joint meeting of the North and South Dakota associations, died May 30. Dr. Gillis had practiced in Mitchell for nearly forty-three years.

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The advertisement regarding home elevator rental or installation as it appears each month in this journal is self-explanatory except to say that Stair-Glide can be one of the greatest comforts imaginable to patients with cardiac handicap, long-term or acute. The relaxing effect of a "ride" instead of a "climb", both in actuality and in contemplation, is psychosomatic therapy of a high order in cases of essential hypertension. It will pay the attending physician to acquaint himself with this instrumentality for an easier way of living on the part of the patient by inquiring of the Bartley Sales Company of Minneapolis, acting as representatives and agents of Stair-Glide,—automatic, quickly installed, helpful to a high degree, on a permanent or rental basis.

ATARAX CALMS SENILE PATIENTS

A group of older people suffering from irritability, loss of appetite, insomnia, and worry over imaginary problems have been aided by treatment with Atarax, the new antitension drug. Dr. Mervin Shalowitz of the Stritch School of Medicine at Loyola University, Chicago, reports in the June 1956 issue of *Geriatrics* that 51 of 54 patients with "senile anxiety" symptoms were relieved by administration of Atarax, made by J. B. Roerig and Company. Dr. Shalowitz describes these people as suffering from strains of retirement, loss of husband or wife, and changes in their living conditions. The patients were also suffering from such physical ailments as generalized or cerebral arteriosclerosis, duodenal ulcers, and diabetes.

Atarax produced a calming effect within three to four days after the first dose, with best results reached in seven days.

The physician notes that the drug helps control the irritability resulting from constriction of the brain's blood vessels because it avoids the hazards of bromide or barbiturate poisoning. No side effects were reported by the patients. In some patients, when placebos were substituted for Atarax, a recurrence of symptoms was noted. "Pronounced" or "good" improvement of anxiety symptoms was obtained in 94.5 per cent of the patients. In most patients, 10 mg. of Atarax three or four times daily appeared to be sufficient to produce a calming effect.

CHEMICALLY UNIQUE APPETITE SUPPRESSANT

A new weight-reducing agent with a chemical structure which differs radically from that of other anorexigents has been introduced by Geigy Pharmaceuticals, Ardsley, New York. A member of the oxazine series, the compound Preludin is a major advance in the field of anorexigenic therapy because it is effective in producing steady, progressive weight loss with a minimum of undesirable side effects on the cardiovascular and central nervous systems. Preludin does not destroy the patient's normal relish for food but instead causes earlier satisfaction of appetite with lesser caloric intake. Weight loss, with only very reasonable dietary limitations, averages approximately 2 lb. a week. However, in grossly overweight patients, the loss tends to be far greater during the initial phases of treatment and then levels off.

Tests have shown that Preludin can combat fatigue without producing such side effects as palpitations, "jumpiness," or insomnia. Laboratory tests also indicate

(Continued on page 35A)

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500. Injection, 50 mg. per cc., vials of 2
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An Exclusive Development of Wyeth Research

ADVERTISERS ANNOUNCEMENTS

(Continued from page 32A)

that Preludin produces only relatively minor changes in cardiac action or circulation. It tends to induce a slight and evenly sustained elevation of mood, thereby producing a more optimistic and cooperative attitude on the part of the patient towards his diet.

RELEASIN STOPS PREMATURE LABOR

Successful stoppage of premature labor in 6 of 8 cases with Releasin, newly developed pregnancy hormone, is announced by Warner-Chilcott Laboratories, New York City and Morris Plains, New Jersey, after an eleven-year research program had proved it possible to produce the hormone from sow ovaries. In 1 case, birth was delayed a month, and the infant reached a weight of 6 lb. 11 oz.

The report stresses causes of premature labor, which were adjudged to be adolescence, obesity, underweight, and such psychosomatic factors as fear of childbirth and emotional rejection of the pregnancy state.

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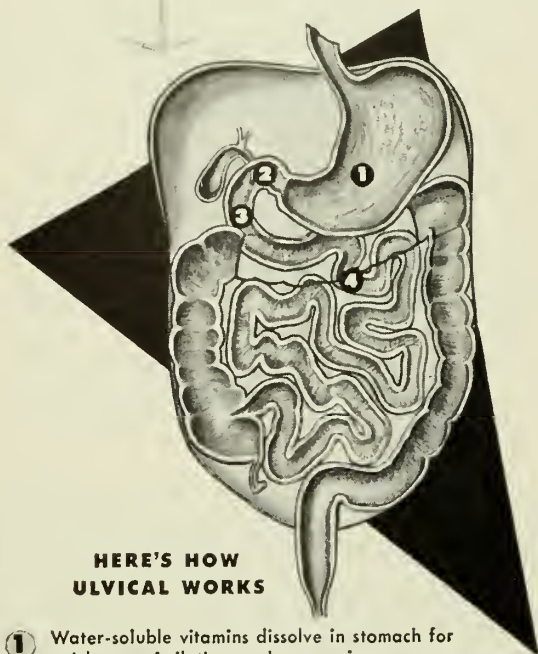
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- ④ Enteric coating over oil-soluble vitamins and vitamin B₂ dissolves in the jejunum at pH 8⁺. Common nausea is thus prevented.

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(from mixed tocopherols)	
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(Fe 38 mg.)	192 mg.
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FOR SALE—Used General Electric, 100 milliampere x-ray machine, good as new. Model R-2-39 Serial No. 288395. Completely dismantled, ready for shipment anywhere. Interested buyer can be assured of a good deal. Write or call Grand Rapids Clinic, 504 - 1st Ave., N.W., Grand Rapids, Minn. Phone FAirview 6-3436.

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SURGEON, 33, qualified for Boards, with good practical experience in General and Industrial Surgery and also orthopedic and thoracic surgery, desires a location, either with a busy surgeon or in a location that offers an opportunity to develop a practice. Write Box 966, The Journal-Lancet, 84 So. 10th St., Minneapolis, Minn.

ASSISTANCE AVAILABLE—Woodward Medical Personnel Bureau (formerly Asnoes—established 1896) have a great group of well trained physicians who are immediately available. Many desire assistantships. Others are specialists qualified to head departments. Also Nurses, Dietitians, Laboratory, X-ray and Physiotherapy Technicians. Negotiations strictly confidential. For biographies please write Ann Woodward, Woodward Medical Personnel Bureau, 185 North Wabash, Chicago.

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COMING in *November*...

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- The information found in "Atherosclerosis and Coronary Heart Disease" by Louis N. Katz, M.D., Jeremiah Stamler, M.D., and Ruth Pick, M.D., of Chicago, is based upon the concept that atherosclerosis is related to alterations in cholesterol-lipid-lipoprotein metabolism. Following this line of thought, an account is presented of the work that has been accomplished in this field by clinical and laboratory investigation and epidemiologic research. From this report, it can be concluded that atherosclerosis is not senescence, and a time can be foreseen when it will be possible to control the disease prophylactically and therapeutically.

- "Bronchography" by Francis J. Curry, Captain in the Medical Corps, at Fitzsimons Army Hospital, Denver, describes the steps to be taken in preparing a patient for this procedure and the course to follow until the final bronchogram is made. The many dangers and complications that may arise are pointed out. Advantages and disadvantages of various contrast media are discussed, and conditions in which bronchography are indicated and contraindicated are listed.

- Some of the means presently employed to determine the presence of infection and the problems encountered in the treatment of patients with idiopathic febrile disease are presented in "Infections and Fever of Undetermined Origin" by Ivan L. Bennett, Jr., M.D., associate professor of medicine at Johns Hopkins University School of Medicine, Baltimore. Antibiotics administered to these patients in an effort to eliminate infection may produce harmful effects and confuse the diagnosis. Such cases require careful observation and clinical tests before diagnosis can be established and proper treatment instituted.

- The busy practitioner can do much to detect carcinoma of the upper respiratory tract at an early stage by respecting early symptoms and performing a thorough examination. With proper instruments and a good source of lighting, the skillful examiner can usually complete the examination in his office without resorting to local anesthesia. Symptoms which may aid in diagnosis and for which the physician should be ever watchful are listed in "Early Recognition of Malignant Disease of the Upper Respiratory Tract" by Jerome A. Hilger, M.D., of St. Paul.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA

MEDICAL CONTINUATION COURSES

October 18-20—Technics in General Practice

October 22-24—Gynecology for General Physicians

November 5-9—Radiation Therapy for Radiologists

November 19-21—Fractures for General Physicians

December 6-8—Physical Medicine

January 7-9—Dermatology for General Physicians

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

OB. AND GYN. MEETING

The American College of Obstetricians and Gynecologists will meet at the Palmer House, Chicago, November 7 through 9. Round table discussions and breakfast conferences will again highlight the meetings. "Consultation Hours," an innovation this year, will be held four times during the meetings. At these sessions, specialists will undertake to answer questions.

KENNY FOUNDATION SCHOLARSHIPS

The Sister Elizabeth Kenny Foundation is offering scholarships designed for scientists at or near the end of their fellowship training in basic or clinical fields concerning neuromuscular diseases. Each grant will provide a stipend for a five-year-period at the rate of \$5,000 to \$7,000 a year. Inquiries should be addressed to Dr. E. J. Huenekens, Medical Director, Sister Elizabeth Kenny Foundation, 2400 Foshay Tower, Minneapolis 2.

FISKE ESSAY ON INFERTILITY

"The Present Day Treatment of Infertility" is the subject of this year's essay contest announced by trustees of the Caleb Fiske Fund of the Rhode Island Medical Society. A prize of \$350 is offered for the dissertation, which must be typewritten, double spaced, and limited to 10,000 words. For complete information, write the Secretary, Caleb Fiske Fund, Rhode Island Medical Society, 106 Francis St., Providence 3. Essays must be submitted by January 10, 1957.

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Knee Injuries in Athletics

DONALD R. LANNIN, M.D.

St. Paul, Minnesota

THE INCREASED AMOUNT of 6-man football being played in smaller schools and the great increase in touchball among intermural teams at colleges and universities has caused a definite rise in the number of knee injuries. The exact diagnosis, extent of injury, and immediate treatment of an acute athletic injury to the knee is extremely difficult. If an injury occurs in the heat of athletic participation, many times the patient does not recognize the exact mechanism of his injury. In spite of this fact, an accurate history is by far the greatest aid in diagnosis. We would like first to consider the points of history which are particularly helpful.

A knowledge of the exact position of the patient's knee and, if possible, the exact mechanism of the injury at the time it occurs is of great advantage. In a completely extended knee, an injury to either the medial or lateral meniscus alone is impossible. If a player is struck from the side with his knee in a fully extended position, an injury to a meniscus may be possible, but only in combination with a tear of the collateral ligaments or some other associated soft tissue or bone injury. If a player is lying on the field and another participant falls on the lateral aspect of his outstretched knee, an injury to the

collateral ligament of the opposite side can be expected. If the knee is injured while a player is in either a completely prone or supine position, an injury to the cruciate ligaments can be anticipated. If the accident occurs with the knee in a flexed position or if a definite twisting mechanism takes place at the time of injury, a tear of the meniscus or a tear with any other combination of injuries must be expected.

The exact location of the initial point of pain is important to determine. If the patient is not seen until the knee is generally swollen, he often has difficulty in localizing the exact point of maximum tenderness. If he can remember at least the side of the knee which was initially painful, some localization can be obtained.

Frequently, the patient is able to describe an abnormal sensation associated with stability of the knee. Some patients volunteer that the knee "slipped out of joint." Some have a feeling that the knee cannot be temporarily extended, but full extension occurs after a few steps are taken. Many patients describe the presence of a click, snap, or tearing sensation. Athletes who associate with other players who have had knee injuries commonly use specific terms in describing their injuries. Therefore, it is important to ask them to describe accurately what they mean by the terms "locking," "dislocation," or "tearing." A feeling of complete locking, which is actually associated with a loss of extension and does not change, requires special attention.

The history of the progress of the knee injury within the first few minutes or hours is extremely important. In some types of meniscus injuries,

DONALD R. LANNIN is clinical assistant professor of orthopedics at the University of Minnesota and orthopedic consultant at the Students' Health Service; acting chief surgeon at Shriners' Hospital for Crippled Children, Minneapolis; and on consulting staffs at Midway, Miller, St. Luke's, St. Joseph's, Children's, and Ancker hospitals, St. Paul.

an immediate continuous slipping or giving away sensation is present in the knee. Some knee injuries produce an immediate swelling of the joint, which is usually an indication of a hemiarthrosis. In others, the swelling occurs gradually over a period of hours, which often is a sign of secondary traumatic synovial reaction. In injuries which produce delayed effusion, patients often complain of a delayed feeling of weakness or instability when no initial feeling of locking or catching was present.

In addition to obtaining a history of past injuries, it is important to know if the patient has had even a minimum amount of knee difficulty within the past few days or weeks. Many types of football injuries produce a minimum tear of a meniscus which the player more or less ignores but which progresses through further trauma to a point that becomes clinically significant.

Severe fractures around the knee area are extremely uncommon in football or in other athletics and are so obvious that they do not usually enter into a differential diagnosis and will not be considered here. We have found that the differential diagnosis is usually among: (1) tears of the collateral ligaments, (2) injuries of the medial or lateral menisci, (3) injuries of the anterior or posterior cruciate, and (4) an occasional injury of the spines of the tibia.

Because of the generally good muscle strength and particularly because of the above average quadriceps stability, diagnosis of a painful knee in an athlete is particularly difficult. For these reasons, we feel that before a physical examination the patient should be given adequate medication for relief of pain in order to allow some muscle relaxation. An extremely swollen knee is also difficult to evaluate. Therefore, we feel that under local anesthesia the knee should be aspirated almost immediately. The character of the fluid obtained, as we have mentioned, is an aid to diagnosis. After the pain has been moderately relieved and the knee is thoroughly dry by aspiration, the regular physical examination can be done more accurately and easily. Our attention is first directed to the amount of both active and passive extension. If the patient stands with his heels together and both knees passively extended, the actual loss of extension of the affected side is quite obvious. Loss of extension in this position with associated medial anterior joint line tenderness is extremely suggestive of a longitudinal tear of the anterior section of the medial meniscus. Very infrequently, locking of this type is associated with a lateral meniscus tear and is then always associated with lateral anterior and posterior knee joint level

tenderness. Loss of a few degrees of active extension of the knee, if no further fluid is present in the knee, directs our attention toward the quadriceps mechanism and is highly suggestive of a partial tear of soft tissue either proximal or distal to the patella. Lateral pressure at knee joint level on the opposite side of the point of maximum complaint gives a good idea of the amount of lateral relaxation present and is some index of the collateral ligament damage. Antero-posterior stability as tested by the "drawer" sign is rather inaccurate. We have been able clinically to diagnose initial complete tears of either the anterior or posterior cruciate ligaments in muscular athletes with only about 50 per cent accuracy. In cases of fracture of the spines of the tibia as shown by radiograph, it is equally difficult to demonstrate cruciate ligament instability. The amount and location of pain present on rotation of the knee with impaction and with distraction should be obtained. We feel that if this test is performed with the patient lying on his abdomen with the knee flexed to 90°, pain on rotation with distraction is a fairly good indication of ligamentous injury with minimum or no meniscus injury, while pain on rotation with impaction is not a particularly good index of the degree of meniscus damage. Tenderness over the joint line medially or laterally is most often associated with an anterior or lateral meniscus tear, while maximum tenderness at the level of the collateral ligaments can indicate either actual ligamentous injury or an associated posterior or far lateral tear of the adjacent meniscus.

Much better information can be obtained from a roentgenogram if it is taken after the knee has been aspirated, as then better extension is possible and the intercondylar notch can be better visualized. In most meniscus and soft-tissue injuries, the radiograph is not of great value except to eliminate osteochondritis dissecans, free bodies, and to establish the presence of an avulsion fracture of the tibial spines or some ligamentous attachment.

Our initial treatment in acute knee injuries is determined by two factors. If, after aspiration of the knee, examination shows residual loss of extension or actual locking, the patient is hospitalized and an attempt is made to unlock the knee by traction. We urge hospitalization as soon as possible because the patient must never walk with the knee in a partially flexed position. On admission, sponge rubber, short leg type traction is applied and the patient is given rather heavy doses of sedatives. This traction is maintained for twenty-four hours and, if by that time complete extension has not been obtained, ar-

throtomy is indicated. The second condition which we usually consider an indication for surgery is the presence of a fracture of the spines of the tibia or an avulsion fracture with an associated tendinous attachment. In such conditions, after the knee has been aspirated, roentgenograms are taken with the knee in a fully extended position and a surgical repair is considered only if the spines or fragments do not fall back into near anatomic position. After a knee has been unlocked by traction or if the roentgenogram shows a satisfactory position of a fracture of the spines of the tibia, the knee is then treated in exactly the same manner as a suspected partial meniscus injury, tear of a collateral ligament, or other soft tissue damage. The initial conservative treatment for all of these injuries is essentially the same. We do not recommend surgical attempts to repair lateral ligamentous type tears, since, in our experience, the end results are as good with conservative therapy. This does not apply to lacerations of the lateral aspects of the knee as, in these cases, the ligaments are cut rather than torn, and satisfactory surgical apposition of ligamentous fibers is possible.

If a full range of active extension is established by examination and if there is no evidence of abnormal stability, an elastic type support is applied to the knee and the patient is allowed to bear his weight on the knee with as near a normal pattern of walking as possible. He is not permitted to return to any type of athletic participation until it is certain that a secondary effusion of the knee will not develop. If any type of secondary effusion prevents full active extension of the knee, the patient should not return to contact participation. Several times we have seen knees severely injured two or three days after a minimum initial injury, because the knee was struck in the vulnerable slightly flexed position. It is particularly important to prevent the athlete from returning to competition until the exact degree of damage has been established.

If the patient has definite evidence of ligamentous injury or a condition, such as a meniscus injury with full extension, satisfactorily reduced fractured spines of the tibia, or suspected partial tears of the cruciate ligaments, a regular course of immobilization must be provided. A compression dressing of sheet wadding covered by an Ace bandage is applied from the webs of the toes to the upper thigh with the knee in a fully extended, but not hyperextended, position. A few layers of plaster splint are then applied to the posterior aspect of the knee and are followed by another evenly placed elastic bandage. The patient is then allowed to walk with crutches

for approximately five days. At the end of that time, the compression dressing is removed and if there is evidence of secondary joint effusion, the knee is aspirated and hydrocortone is injected into the joint. A completely nonpadded stovepipe plaster is then applied over stockinet and tape extending from the lower calf to the high thigh with the knee again in an extended position. In a cast of this type, the patient is able to walk easily without crutches and is comfortable. As soon as this cast is applied, a regular course of straight leg raising exercises is started and directed toward maintaining quadriceps strength. For the first few days, this exercise is performed five minutes out of each hour. As the quadriceps strength returns, weights are applied to the foot and gradually increased until maximum strength has been obtained. Depending somewhat on the severity of the injury, this stovepipe plaster is left in place three to six weeks after the date of the injury. It is then removed and a simple elastic bandage is applied to the knee area and both flexion and extension exercises are begun. At this time, the elastic support is worn only during the day and is gradually removed as swelling of the joint decreases. The elastic support is discarded as soon as possible because it tends to hinder quadriceps development. Most high school athletes should be able to hold a 20-lb. foot weight in a fully extended position for one minute before returning to any type of athletic practice. Most college athletes hold 25 to 35 lb. for this period before the knee is stable enough to resume competition. Our experience has shown that many athletes with cruciate ligament tears obtain such excellent quadriceps strength that anteroposterior instability is impossible to demonstrate on examination and they are able to return to regular competition with the development of only minimum amounts of increased joint fluid formation. We feel that a knee brace or knee cage should be condemned. No such brace can substitute for adequate quadriceps strength and if a patient's knee stability is poor enough to require a brace, he should not attempt contact athletics. Taping the knee is of real value for short periods only.

We are reviewing a series of over 300 athletic injuries of the knee in high school and college athletes, and we believe that in general most of these injuries are initially undertreated. At surgery, there is often definite evidence of partial healing of meniscus tears, and we feel that if these knees had been better immobilized, some arthrotomies would have been avoided. We hope that in the future more injuries will receive adequate immobilization and conservative therapy.

Cobalt-Iron Therapy for Common Types of Anemia

DONALD C. AUSMAN, M.D.

Milwaukee, Wisconsin

THE MAJORITY OF ANEMIAS seen in general practice fall into 3 categories: low-grade normocytic anemia due to infection or chronic disease; hypochromic anemia caused by iron deficiency; and borderline anemia due to some defect in the life cycle of the red blood cell. The first type is seen in both male and female patients; the second is more common in women because of the precarious iron balance due to menstrual losses and pregnancy.¹

The average female is borderline iron deficient, so a superimposed marrow inhibition may often result in anemia characterized both by a pre-existing iron deficiency and by decreased erythropoiesis.

METHODS AND MATERIALS

We have studied the results of therapy in 44 anemic patients who presented themselves at the clinic. All hematologic techniques were done in our own laboratory by experienced technicians.

Cell size was estimated by calculation of the mean corpuscular volume (M.C.V.) and the volume index (V.I.); erythrocyte hemoglobin content was estimated by calculation of the mean corpuscular hemoglobin (M.C.H.), the mean corpuscular hemoglobin concentration (M.C.H.C.), and the saturation index (S.I.). In some of the preliminary data, the color index (C.I.) was also used as a rough guide. The appearance of the red cells in the differential smear was always used as a rough check on the calculated corpuscular constants.

RESULTS

Anemia with apparent inhibition of hemopoiesis. Osteoarthritis was present in 2 of our female patients (I. O. and E. K.), aged 63 and 70 respectively. Both were receiving a course of streptococcus vaccine, and I. O. received 200 mg. of phenylbutazone daily. Rheumatoid arthritis was present in 1 female (C. C.), aged 51, who received gold injections and, in addition, oral estrogen therapy to relieve menopausal symptoms. Therapy was begun with a cobalt-iron preparation (Roncovite). Initial and final hematologic values for these patients are found in table 1.

DONALD C. AUSMAN, a 1930 graduate of Marquette University School of Medicine, is associated with the Ausman Clinic, Milwaukee.

The results were considered to be good in all 3 cases. Existing iron deficiency was almost completely corrected. An increase in erythrocytes occurred, and the new total cell population approached the normal in cell size and in hemoglobin content per cell.

After a three-week lapse from treatment, an additional four weeks of cobalt-iron therapy given to I. O. produced no essential change in blood findings. The maximum benefit had been reached during the original twelve weeks of treatment. Of interest, however, is the fact that polycythemia did not occur.

E. K. was rechecked hematologically two months and five months after the original course of treatment. Blood values were not significantly changed after two months. However, after five months, the hemoglobin had increased to 14.2 gm. per 100 cc., and M.C.H.C. was 32 per cent. Since there was no improvement in the arthritic process, it would appear that the previously depressed marrow had continued to respond in a normal manner after therapy was discontinued.

In the more severe anemia exhibited by C. C., an additional six weeks of therapy resulted in an increase in M.C.H.C. to 31 per cent with no increase in total hemoglobin. Recheck six months later showed the patient to be in an excellent hematologic status.

One additional patient (R. G.), a 50-year-old female with osteoarthritis, was treated with cobalt-iron for seven weeks. Hemoglobin rose from 8.5 gm. per 100 cc. to 14.6 gm. per 100 cc. The indices were essentially normal at the time therapy was discontinued. Data are not included in table 1 because initial indices are not available.

In our experience, responses of the magnitude achieved with I. O. and E. K. could not have been expected with ordinary iron therapy.

Cancer. Carcinoma was the presumed cause of anemia in 2 male patients. A. K., aged 68, had adenocarcinoma of the rectum; G. W., aged 68, had prostatic carcinoma with generalized osseous metastasis. The latter received stilbestrol during therapy for anemia. Initial and treatment data are given for these 2 cases in table 2.

The hematologic results in these 2 patients are

TABLE 1
COBALT-IRON THERAPY IN THE ANEMIA ACCOMPANYING ARTHRITIS

Case	Time	Cell values				Hemoglobin values				Dose
		RBC $\times 10^6$	Hemato- crit	M.C.V.	V.I.	Hgb. (gm.)	M.C.H.	M.C.H.C.	S.I.	
I. O.	Initial	4.09	45	111	1.28	11.2	27	25	.75	—
	12 wk.	4.82	45	94	1.08	12.9	27	29	.86	1 t.i.d.
E. K.	Initial	4.2	44	105	1.23	11.2	27	26	.76	—
	10 wk.	4.9	44	91	1.05	12.1	25	28	.83	1 t.i.d.
C. C.	Initial	4.02	31	78	.89	8.5	21	27	.82	—
	12 wk.	4.93	42	86	.99	12.2	25	29	.88	1 q.i.d.

TABLE 2
COBALT-IRON THERAPY IN THE ANEMIA ACCOMPANYING CARCINOMA

Case	Time	Cell values				Hemoglobin values				Dose
		RBC $\times 10^6$	Hemato- crit	M.C.V.	V.I.	Hgb. (gm.)	M.C.H.	M.C.H.C.	S.I.	
A. K.	Initial	3.8	39	102	1.1	11.0	29	28	0.8	—
	4 wk.	4.3	43	100	1.15	12.4	29	29	0.8	1 q.i.d.
G. W.	Initial	3.01	30	100	1.15	9.2	30	31	0.9	—
	4 wk.	3.2	33	100	1.1	9.6	29	29	0.8	1 q.i.d.
	12 wk.	3.7	37	100	1.15	11.4	31	31	0.9	1 q.i.d.
	22 wk.	4.5	43	98	1.13	12.8	27	31	0.9	1 q.i.d.

considered to be very good, since cell counts and hemoglobin values rose significantly. A. K. benefited promptly, but G. W. required prolonged treatment.

Recheck of G. W. six months after therapy showed essential maintenance of the hematologic status reached during treatment.

Two additional patients (A. S.₁ and A. S.₂), aged 64 and 47 respectively, presented a continuing low-grade anemia after mastectomy for carcinoma. At this time, both patients showed a hemoglobin value of 11.2 gm. per 100 cc. and erythrocyte counts slightly below 4 million cells per cmm. The anemia appeared to be slightly hypochromic in 1 and normochromic in the other. After three weeks of cobalt-iron therapy (1 tablet three times a day) for 1 patient and eight weeks of treatment for the other, blood indices were essentially normal and remained so as rechecks proved nine and fifteen months later.

The hemopoietic inhibition in these 2 latter patients may have been eliminated by surgical means, but such has not always been our experience in other similar cases.

Hypothyroid state. Hypothyroidism was present in 2 of our patients. A. M. was definitely myxedematous; E. H. was moderately hypothyroid. Both patients received thyroid extract, 1 gr. daily which relieved symptoms and brought the basal metabolism values within normal range.

E. H. was then given 1 tablet of cobalt-iron therapy four times a day for three weeks. Hemoglobin rose to 14.6 gm., the cell count to 4.9 million per cmm., and the M.C.H.C. from 27 to 33 per cent. An additional month of treatment produced no significant change in blood values.

Seven months later, with no intervening anti-anemic therapy, the patient's blood values had fallen to 12.8 gm. hemoglobin per 100 cc. Hematocrit had dropped from 47 to 41. A month's iron therapy with another preparation equivalent to 15 gr. of ferrous sulfate per day produced no improvement.

A. M. was started on 15 gr. of ferrous sulphate per day and continued for approximately three months without significant improvement in hemoglobin, red count, or blood indices. Another iron preparation was administered for six weeks with no benefit. After one month without hematonic therapy, 1 tablet of cobalt-iron was given four times a day for four weeks. No change in cell indices occurred, but hemoglobin rose promptly to 12.45 gm. per 100 cc.

A single "paired case" experiment justifies no general conclusions. However, it seems rather clear that in these 2 patients, iron and thyroid were ineffective while cobalt-iron and thyroid produced rapid hematologic improvement. No exacerbation of the hypothyroid state occurred during treatment with cobalt.

Gastrointestinal or dietary abnormality. Gastrointestinal conditions or dietary abnormalities were associated with anemia in 7 patients. In none did iron deficiency appear to be the primary factor. All were females and 6 were of menstrual age. Gallbladder dysfunction was present in 2 patients (T. A. and P. S.), aged 64 and 36 respectively. L. H. received antispasmodic-alkali therapy for recurrent duodenal "spasm;" A. B. had intermittent diarrhea; C. H. was obese and received amphetamine. G. G. and A. S.₃ received special diets, the former because of food

TABLE 3
IRON THERAPY IN PATIENTS WITH ANEMIA ASSOCIATED WITH DIETARY OR
GASTROINTESTINAL ABNORMALITIES

Case	Initial values			FeSO ₄ gr./ day	Treatment period	Post-treatment values		
	Hgb. Gm. %	RBC x10 ⁶	°C.I.			Hgb.	RBC	°C.I.
G. G.	11.2	3.9	1.0	10	6 wk.	11.4	4.9	.8
A. B.	11.2	3.9	1.0	15	4 wk.	11.2	4.1	.9
T. A.	10.7	4.1	.9	15	9 wk.	11.2	4.0	1.0
L. H.	11.8	3.9	1.0	20	6 wk.	12.1	4.6	.9
C. H.	11.0	3.5	1.1	20	12 wk.	12.5	4.5	1.0

*Values for the C.I. were calculated on the basis: normal hemoglobin = 14.5 gm./100 cc.

TABLE 4

Case	Time since previous iron therapy	Roncovite dosage used	Time RCV given	Initial values				Post-treatment values			
				Hgb.	RBC	V.I.	M.C.H.C.	Hgb.	RBC	V.I.	M.C.H.C.
G. G.	7 wk.	1 t.i.d.	7 wk.	11.2	4.1	—	—	14.2	4.7	1.08	32
A. B.	2 wk.	1 q.i.d.	3 wk.	11.2	4.1	—	—	12.0	4.2	—	—
T. A.	4 mo.	1 t.i.d.	4 wk.	11.2	4.0	—	—	12.0	4.3	1.2	28
L. H.	6 wk.	1 q.i.d.	3 wk.	11.8	4.3	1.05	31	13.4	4.5	1.06	32
C. H.	2½ yr.	1 q.i.d.	3 mo.	10.7	3.8	—	—	13.8	4.5	1.12	31
P. S.	No iron therapy	1 t.i.d.	4 wk.	10.9	3.7	1.1	30	10.9	3.9	1.1	30
A. S.	No iron therapy	1 t.i.d.	2 mo.	10.8	3.6	1.3	26	12.2	4.5	1.1	29

allergy and the latter because of diabetes mellitus controlled with insulin. No other cause of anemia could be found in any of these patients. Ferrous sulfate was given to 5 patients (G. G., A. B., T. A., L. H., C. H.) and hematologic improvement was evaluated. These 5 and 2 others (P. S., A. S.) were then given cobalt-iron therapy. Data are shown in table 3.

The response to iron therapy in our 5 patients who first received iron alone was relatively poor in 4 and satisfactory only in the obese patient.

All of these patients were available to us after a considerable lapse of time. Accordingly, cobalt-iron was administered and the results evaluated. Table 4 shows the lapse of time between the two forms of therapy and the results with cobalt-iron in these and in 2 additional patients in whom iron was not previously used.

Comparison of the data in tables 3 and 4 shows that cobalt-iron was clearly superior in extent of response and in rapidity of action in all 5 patients who received both iron and cobalt-iron.

Iron-deficiency anemia. Menstrual blood loss or previous pregnancy was the only cause for anemia in 18 patients. Generally, it was not severe. All had previously received iron therapy for four weeks to three and one-half months.

After an interval during which no treatment was given, these patients were placed on cobalt-iron therapy; 14 patients received 3 tablets a day; 4 received 4 tablets. Each patient was treated for approximately the period of time or less than she had previously received an iron prepa-

ration. Data are shown in table 5.

Of the 18 patients compared in table 5, individual values showed that 12 improved under iron therapy; 6 did not. With cobalt-iron therapy, 17 of these same patients improved; only 1 did not. Superiority of cobalt-iron therapy for iron-deficient patients probably lies in improved utilization or absorption of iron due to the erythropoietic action of cobalt.

An additional group of 9 iron-deficient anemic patients, who had not received previous iron therapy, were also treated with cobalt-iron. Combining the results in these patients with data in table 5 provides the comparison in table 6.

TOXICITY AND SIDE EFFECTS

There is little actual published data attributing any significant toxicity to cobalt in the recommended therapeutic dosages.

Chest pain was reported by Berk and associates² in a single elderly patient receiving very large doses of cobalt and also by Crosby³ in an elderly patient. None of our patients developed any such symptoms.

Nausea and vomiting have been mentioned as toxic effects so severe as to restrict usefulness of cobalt. This is no doubt true of large doses in aqueous solution, but Gardner⁴ has pointed out that enteric-coated tablets are well tolerated. In our study, neither of these side effects was a problem. Gastrointestinal tolerance to cobalt-iron did not differ appreciably from that shown to most oral iron preparations.

TABLE 5
COMPARATIVE RESPONSE TO COBALT-IRON AND TO IRON
IN IRON-DEFICIENCY ANEMIA DUE TO CHRONIC BLOOD LOSS

Hemoglobin level	Number of patients			
	Iron therapy		Cobalt-iron therapy	
	Initial value	After treatment	Initial value	After treatment
8.0 to 8.9	—	—	1	—
9.0 to 9.9	3	—	—	—
10.0 to 10.9	5	2	4	—
11.0 to 11.9	3	10	7	2
12.0 to 12.9	7	1	5	4
13.0 to 13.9	—	5	1	12
	18	18	18	18

TABLE 6
COMPARATIVE RESPONSE TO COBALT-IRON AND TO IRON
IN IRON-DEFICIENCY ANEMIA DUE TO CHRONIC BLOOD LOSS

Hemoglobin level	Number of patients			
	Iron therapy		Cobalt-iron therapy	
	Initial value	After treatment	Initial value	After treatment
8.0 to 8.9	—	—	1	—
9.0 to 9.9	3	—	—	—
10.0 to 10.9	5	2	4	—
11.0 to 11.9	3	10	15	5
12.0 to 12.9	7	1	6	5
13.0 to 13.9	—	5	1	14
14.0 to 14.9	—	—	—	3
	18	18	27	27

A skin rash developed in 2 patients taking cobalt-iron; this presumably was due to an allergic response to cobalt. Neither case required discontinuance of therapy; the rash disappeared promptly when treatment was completed.

DISCUSSION

In our opinion, routine use of cobalt-iron therapy offers advantages over the use of iron alone in the treatment of many common anemias seen in general practice. This is particularly true of the iron deficiency anemia occurring so often in female patients as a result of menstrual blood loss or pregnancy. Roncovite was not only more rapid and effective than oral iron but was effective even in cases which had previously failed to respond to the administration of intravenous iron.

The response in one of the patients to cobalt-iron therapy may indicate that the primary action of cobalt is upon erythropoiesis and that the iron component of the mixture simply supplies that needed for hemoglobin synthesis. Our data would also indicate that at least some such patients tend to maintain their improved hematologic status after therapy is discontinued.

REFERENCES

1. HOLLY, R. G.: Iron and iron-binding capacity of serum and the erythrocyte protoporphyrin in pregnancy. *Obst. & Gynec.* 2:119-126, 1953.
2. BERK, L., BURCHENAL, J. J., and CASTLE, W. B.: Erythropoietic effect of cobalt in patients with or without anemia. *New England J. Med.* 240:754-761, 1949.

Iron deficiency is to be suspected when an anemia accompanies dietary restriction or gastrointestinal disease in the female patient. Response to iron therapy alone can be unsatisfactory, and an absorption defect is often postulated as the cause.

It is suggested that cobalt must increase the absorption of iron either by direct action or as a result of the demand resulting from an increase in erythropoiesis.

SUMMARY AND CONCLUSIONS

The use of cobalt-iron therapy in conditions characterized by an inhibition of hemopoiesis is entirely rational in the majority of females or where blood loss is also a factor in the male.

Anemias in 10 patients—arthritis in 4, carcinoma in 4, thyroid insufficiency in 2—responded well to cobalt-iron therapy (Roncovite).

Comparative results with iron and with cobalt-iron therapy are presented on a group of the same 18 patients with iron-deficiency anemia due to menstrual blood loss or previous pregnancy. With iron alone, 12 of 18 patients improved their hematologic status; 6 did not. Only 5 of these patients reached a hemoglobin level of 13 gm. per 100 cc. or better. With cobalt-iron therapy, 17 patients improved hematologically; only 1 did not. Further, 12 of the 18 patients reached hemoglobin values of 13 gm. per 100 cc. or better.

In 5 patients with anemias associated with dietary restriction or gastrointestinal diseases, response was poor to iron therapy but excellent to cobalt-iron as it was in 2 additional patients.

No toxic symptoms were seen during cobalt-iron therapy in our series of patients, and we gained the impression that gastrointestinal tolerance seemed to be similar to that shown toward ferrous sulfate. A skin rash appeared in 2 of our patients during cobalt-iron therapy. It was not severe enough to discontinue therapy and disappeared promptly when treatment was completed.

The tablet form of Roncovite, manufactured by Lloyd Brothers, Inc., Cincinnati, Ohio, was used throughout this study. Each tablet is stated to contain 15 mg. of cobalt chloride and 200 mg. of exsiccated ferrous sulfate. This corresponds to approximately 5 gr. of the ordinary ferrous sulfate. Dosages used are recorded simply as number of tablets daily for the sake of brevity in the tabulation.

Acknowledgments: The author is indebted to Helen Ellis and Kathy Zetzman for their help in the technical and statistical assistance.

3. CROSBY, W.: Use of cobalt and cobalt-iron preparations in the therapy of anemia, (panels in therapy). *Blood* 10:855, 1955.
4. GARDNER, F.: Use of cobaltous chloride in the anemia associated with chronic renal disease. *J. Lab. & Clin. Med.* 41: 56-64, 1953.

American College Health Association News . . .

Robert H. Vadheim, M.D., director of the Health Service at the University of Florida, reports a meeting of the southern section of the A.C.H.A. in Greensboro, North Carolina in July. Dr. Vadheim is president of the southern group and Dr. Roy Mason of Emory University in Georgia has been named president-elect.

Kathleen Wilkinson Wooten, professor emeritus of health at Georgia State College for Women at Milledgeville, sends the following interesting note along with her order for a copy of the Proceedings of the Fourth National Conference on Health in Colleges.

"I am interested in completing my set of reports of the National Conferences on Health in Colleges, first, because I was a participant in the first three and wish to see what was done at the fourth; second, I am giving my forty-year collection of Health Education and Safety Education materials to the Research Library of Florida State University because one of my old students, Dr. Sarah Louise Smith, is now doing an excellent job there as head of the Health Department."

Several notices have come into the office in the past month regarding personnel changes in member colleges.

Emory R. Irvin, M.D., has been appointed health officer at Virginia Polytechnic Institute, Blacksburg, Virginia. Dr. Irvin had been in general practice in Bradford, Ohio, for twenty-three years.

George W. McCoy, Jr., M.D., has been named director of the Health Service at Lehigh University, Bethlehem, Pennsylvania, replacing Dr. Carl O. Keck who resigned. A student health physician is needed at Washington State College, Pullman, Washington. The salary is \$8,000 to \$9,500, depending on whether a three or one month vacation is taken. Slightly more is being offered for exceptional training or experience. Two other physicians and a part-time psychiatrist complete the staff. Pullman's population is 7,000 plus the 5,500 college students. All types of medical and surgical conditions occurring in general practice are cared for by the college physicians. If interested, write Harry Zion, M.D., director of Student Health Service, Washington State College, Pullman, Washington.

Dr. John H. Stibbs, dean of students at Tulane University in New Orleans, states that for the first time at Tulane the position of full-time director of Student Health is to be established. Interested physicians should contact Dean Stibbs.

Neurochemistry: The Chemical Dynamics of Brain and Nerve, edited by K. A. C. ELLIOTT, IRVINE PAGE, J. H. QUASTEL, 1955. Springfield, Illinois: Charles C Thomas. 900 pages. \$19.50.

This timely volume should serve both as a text and reference book in years to come for those clinicians and fundamentalists who are interested in the field of brain chemistry. The 32 collaborators, including the 3 editors, are to be commended for their comprehensive and precise presentations.

The chapter on brain and nerve, although somewhat brief, is excellent. The author's descriptions of the various brain lipids are vivid and clear, and he points out some recent changes in the chemical formulas of the cephalins, sphingomyelins, and cerebroside. Relatively new brain compounds are brought to light, such as proteolipids, lipoproteins and liponucleoproteins.

In subsequent chapters, other distinguished investigators describe, discuss, and summarize in an orderly fashion tissue restoration, brain glycolysis, and oxidative processes. The metabolism of glutamic acid, glutamine, nucleic acids, and nucleoproteins are beautifully reviewed by two of the world's authorities in these fields. Nerve-cell formation and metabolism of the nervous system are considered in following chapters. The book then contains several sections dealing with patho-



logic physiology induced by acute chemical changes, neurotropic drugs, neurotoxins of bacterial origin and those of snake venoms, and the toxic effects of oxygen. The biochemical aspects of narcosis is comprehensively reviewed.

In one of the chapters on acetylcholine, this compound's synthesis and breakdown is carefully discussed, as is cholinesterase and bound forms of acetylcholine. Careful consideration is given to this compound in relation to its synthesis as influenced by sugars, adenosine triphosphate, tyruvic acid, some of the B vitamins, and citrate metabolism. In a separate lengthy and comprehensive chapter, the physiologic significance of acetylcholine is considered in its relation to its presence in various tissues, such as the sympathetic and vagus nerves, its synaptic metabolism in brain and spinal cord, its relation to the nerve impulses, its chemistry, pharmacology and coenzyme A metabolism.

Another illuminating chapter on

behavior disorders carefully discusses the pros and cons of mental disease in regard to blood findings of the lipid, carbohydrate, and other metabolites. In discussing cholesterol metabolism, an important issue brought to light is that a lowered serum cholesterol was agreed upon by several investigators working with various stages of schizophrenia.

The chapter on steroid hormones and events in the nervous system describes and discusses various experiments in animal and man. Effects of steroids on the mental state and on the brain wave pattern are reviewed. The action of steroids on brain protein and enzyme systems, as well as electrolyte balance of the brain, are considered. This chapter concludes with an excellent discussion of adrenal steroids in relation to rat brain metabolism, especially the findings in the rat brain electrocorticogram.

The volume next deals with some diseases of the nervous system, including nutritional disturbances, convulsive disorders, inborn errors of metabolism, biochemistry of demyelination, and neuromuscular disorders. The book concludes with a chapter on the chemistry and pathology of the central nervous system of arthropods and a final chapter titled "Thermodynamics of the Message."

The book contains an excellent bibliography of each subject discussed.

RALPH ROSSEN, M.D.

Transactions of the North Dakota State Medical Association

Sixty-Ninth Annual Meeting

Aberdeen, South Dakota, June 2, 3, 4, 5, and 6, 1956

SECOND SESSION, HOUSE OF DELEGATES

Sunday Afternoon, June 3, 1956

Aberdeen, South Dakota

The second session of the House of Delegates was called to order by speaker Dodds at 2:00 p.m., June 3, 1956, at the Alonzo Ward Hotel, Aberdeen, South Dakota. Dr. Kohlmeier, chairman of the Credentials Committee, reported that a quorum was present and secretary Boerth called the roll. The following doctors responded:

G. W. Toomey, Devils Lake; R. M. Fawcett, alternate, Devils Lake; G. C. Foster, Fargo; D. G. Jaehning, alternate, Wahpeton; R. C. Painter, Grand Forks; Bruce Boynton, Grafton; A. C. Kohlmeier, Larimore; F. A. Hill, Grand Forks; J. A. Sandmeyer, Grand Forks; V. J. Fischer, Minot; A. F. Hammargren, Harvey; A. R. Sorenson, Minot; N. A. Macdonald, alternate, Valley City; R. W. Henderson, Bismarck; Carl Baumgartner, Bismarck; C. H. Peters, Bismarck; Keith Foster, Dickinson; Richard Raasch, alternate, Dickinson; T. E. Pederson, Jamestown; John Van der Linde, Jamestown; R. W. McLean, Hillsboro; J. D. Craven, Williston. Twenty-two doctors answered the roll call.

The following attended the meeting: Drs. R. H. Waldschmidt, C. J. Glaspel, Joseph Sorkness, R. D. Nierling, W. A. Wright, J. C. Fawcett, R. B. Radl, P. H. Woutat, D. J. Halliday, R. W. Rodgers, O. A. Sedlak, and Mr. Lyle Limond.

The first order of business was the selection of a meeting place for the 1957 session. At this time, the chair called upon Dr. George Foster, president of the First District Medical Society. Dr. Foster extended an invitation to the association to hold the annual meeting in Fargo next year and made the motion that the 1957 annual meeting be held in Fargo, North Dakota. This was seconded by Dr. Boynton and carried.

REPORTS OF REFERENCE COMMITTEES

Reference Committee to Consider the Reports of the President, Secretary, Executive Secretary, and Treasurer

Dr. T. E. Pederson, chairman, presented the following reports and their discussions, which were adopted section by section and as a whole:

1. *Report of the President.* Your committee has reviewed the report of the president. We endorse the action of the president in establishing separate committees for public relations and legislation.

We heartily concur with the president urging each member to become familiar with the Bricker Amendment, the Jenkins and Keogh Bills, and the George Amendment to H.R. 7225.

It is with pleasure that we note the successful continuing medical-press conferences and initial medical-legal conference. We feel these two types of conferences should be continued.

With pleasure we note the strengthening of the board of editors of THE JOURNAL-LANCET.

We agree that active participation must be maintained in the Governor's Health Planning Conference, and that membership in this conference be proposed by the Nominating Committee.

We concur with the president in commending Dr. A.

D. McCannel and his committee in compiling and publishing "Medical Milestones in North Dakota."

We feel that President Halliday has performed his duties creditably and is very deserving of the gratitude of the state association members.

Speaker Dodds asked the House of Delegates to give President D. J. Halliday a rising vote of thanks for his efforts during the past year. This vote of thanks was given. This portion of the report was unanimously adopted.

2. *Report of the Secretary:* The reference committee reviewed the report of the secretary and feels that prompt collection of dues is still the province of the local society. We agree that dues should be forwarded as collected. This portion of the report was adopted.

3. *Report of the Executive Secretary:* Your reference committee reviewed the report of the executive secretary and noted with pleasure that the productive effort by our executive secretary has been maintained at a high level. We note with appreciation the effectiveness of the state Physician's Placement Service in the placement of 9 physicians in the state.

The committee suggests consideration for his "Thoughts for the Future," and commends him for the fine job he has done. This portion of the report was adopted.

4. *Report of the Treasurer:* The report of the treasurer was carefully perused, and we move that this portion of the report be adopted. This portion of the report was adopted.

The motion was made by Dr. Pederson, seconded by Dr. Baumgartner, that the report be adopted as a whole. Motion carried.

T. E. PEDERSON, M.D., chairman
N. A. MACDONALD, M.D.

Reference Committee to Consider the Reports of the Council, Councillors, and Special Committees

Dr. Boynton, chairman, presented the following reports and their discussions, which were adopted section by section and as a whole:

1. *Report of the Chairman of the Council:* Your reference committee has reviewed the report of the chairman of the council. We think the suggestion of the council to elect delegates to the state meeting for more than one year to enable them to become better acquainted with the work of the association is a good one.

This portion of the report was adopted.

2. *Reports of the Councillors:* Your reference committee has reviewed the various reports of the councillors and wishes to commend the members of the association on the number and caliber of the meetings that have been held during the past year.

Your committee respectfully suggests that the speaker of the House of Delegates prepare an outline form for the councillors for preparation of their annual reports so that essential information will not be omitted. We feel that this should include the names of officers, new mem-

bers, members leaving the district, deaths, speakers, and their topics. This outline form could be sent by the executive secretary to each councillor. This portion of the report was adopted.

3. *Report of the Committee on Emergency Medical Service:* The report of the Committee on Emergency Medical Service has been reviewed, and we concur with these proposals. This portion of the report was adopted.

4. *Report of the Committee on Displaced Physicians:* The report of the Committee on Displaced Physicians has been reviewed, and we wish to commend this committee on the handling of a difficult and delicate problem. This portion of the report was adopted.

5. *Report of the Committee on American Medical Education Foundation:* The report of the Committee on American Medical Education Foundation has been reviewed, and we feel that this report requires the attention of all members and their support in the work being advanced by this committee and the Woman's Auxiliary. This portion of the report was adopted.

6. *Report of the Committee on Mental Health:* Report of the Committee on Mental Health has been reviewed, and we note that no meetings were held during the year. It is our thought that this committee should be composed of fewer members and be encouraged to have a definite program of meetings during the year. This portion of the report was adopted.

7. *Report of the Committee on Diabetes:* The report of the Committee on Diabetes has been reviewed, and we move the adoption of this report. This portion of the report was adopted.

The motion was made by Dr. Boynton, and seconded by Dr. Baumgartner, that the report as a whole be adopted. Motion carried.

BRUCE BOYNTON, M.D., chairman
A. K. LEWIS, M.D.
D. G. JAEHNING, M.D.
RICHARD RAASCH, M.D.

Reference Committee to Consider the Reports of the Delegate to the A.M.A., Medical Center Advisory Council, and the Committee on Medical Education

Dr. J. D. Craven, chairman, presented the following reports and their discussions, which were adopted section by section and as a whole:

1. Your Reference Committee has reviewed the report of your delegate to the American Medical Association and wishes to commend Dr. Wright for his comprehensive report.

Many of the problems concerning the A.M.A. House of Delegates and cited by Dr. Wright in his report are still pending and will presumably be reported on further at another time. This portion of the report was adopted.

2. Your committee has reviewed the report of your representative to the Medical Center Advisory Council and wishes to acknowledge Dr. Woutat's faithful attendance at all meetings. We suggest that the House of Delegates endorse and urge the full cooperation of our members toward the success of the new Rehabilitation Center to be built at the University of North Dakota.

Your committee concurs in the opinion of the Medical Center Advisory Council that a virus laboratory be established and operated by the state department of health. This portion of the report was adopted.

3. Your committee has reviewed the brief report of the committee on Medical Education and notes that the committee recommends that the House of Delegates consider plans to create a loan for third and fourth year medical students in need of financial assistance.

We suggest that a loan fund assessment of \$5 per annum for a limited period of time be levied against the members of the association.

We would like further discussion by the house on this point. We move the adoption of this portion of the report.

A general discussion next followed among the members of the house, and it was the general consensus that an assessment of this type should not be made. Several suggestions from the various delegates followed.

Speaker Dodds informed the house that if the report of the Committee on Medical Education, as previously stated, is adopted, the assessment is put into effect. He asked all those in favor of the motion as presented to signify by raising their right hand and those opposed to raise their left hand. The motion was defeated.

He then asked Dr. Craven to present this report without that clause in it, and it would be dealt with, without the part regarding the loan assessment.

Dr. Craven gave the report as follows: Your Reference Committee has reviewed the brief report of the Committee on Medical Education and notes that the committee recommends that the House of Delegates consider plans to create a loan fund for third and fourth year medical students in need of financial assistance. This portion of the report was adopted.

Dr. Craven made the motion that the report be adopted as a whole with the change made in the report of the Committee on Medical Education. Dr. Pederson seconded the motion and it carried.

J. D. CRAVEN, M.D., chairman
KEITH FOSTER, M.D.
R. W. McLEAN, M.D.

Dr. Sorenson at this time made the motion that the chair appoint a committee of 3 to study this project and evaluate and report at the 1957 Session of the House, regarding the loan fund assessment of \$5 suggested in the first report of the reference committee. This motion was seconded by Dr. Sandmeyer and carried. The chair, therefore, appointed Dr. Sorenson as chairman and Dr. Peters and Dr. Craven to this committee and requested that the secretary put that in writing.

Reference Committee to Consider the Reports of the Standing Committees

Dr. Sorenson, chairman, presented the following reports and their discussions, which were adopted section by section and as a whole.

1. Your reference committee commends Dr. A. D. McCannel and Dr. E. H. Boerth for the effort and time they have expended in compiling and publishing the book "Medical Milestones in North Dakota." This book, when completed, should be a must in the library of every doctor in the state.

2. During the past year, 7 of our brothers have passed from our midst, namely: Drs. O. M. DeMouilly, A. D. Strom, O. A. Knutson, Samuel Miller, George H. Holt, Edward G. Nicholson, and Clarence E. Lommen.

We would ask that this assembly stand in a moment of silence as a tribute to their memories. The House stood in a moment of silence. This portion of the report was adopted.

3. Your committee has reviewed the report of the Committee on Legislation and notes that this committee has not been active during the past year due to the fact that our state has not had a legislative session.

However, the committee is thinking ahead and we quote from their report the following: "That the Medical Association should become cognizant of the fact that the Medical Practice Act of this state is out-dated and out-

moded, there having been no amendments or alterations made to this Medical Practice Act since the year 1911. It is now reaching a point where something must be done to correct the situation." This portion of the report was adopted.

4. The committee has reviewed the report of the Committee on Public Relations, and this committee points forcibly to a rather neglected activity of our association, namely, good public relations. They recommend that "in the next year definite activities must and should be directed towards acquainting the medical profession of North Dakota with the importance of good Public Relations." This portion of the report was adopted.

Speaker Dodds asked for discussion about the portion of the report dealing with the public relations of the association and Dr. Halliday responded as follows:

"I attended a National Public Relations meeting with Dr. Cartwright in Chicago last fall. It is all very well to appoint a public relations committee, but the rest of us seem to want the committee to do all the work. That is the wrong attitude. Every doctor in the state is a public relations man. We should not leave this entirely up to this one body to point up our public relations. I am sorry Dr. Cartwright is not here as he would be able to give you some of the important things that developed at this meeting. The Science Fair that has been carried on in two or three cities in the state is a wonderful public relations project. There are a number of things that doctors could do toward public relations where they live, such as talk to P.T.A. groups."

Speaker Dodds suggested that if any members of the house had any thoughts on the matter, they could be passed along to the Committee on Public Relations.

Dr. Boynton stated that he believed those children who take part in the Science Fair could present their exhibits at the annual meetings. The medical group should support these caravans by perhaps paying transportation costs to and from the Science Fair. This portion of the report was adopted.

5. Your committee notes that the Committee on Geriatrics and Rehabilitation has given thought to and laid the groundwork for, further study of whatever activities this association may partake in this, to it, a practically new field. The suggestion was made by the Medical Center Advisory Council that this committee might serve as an advisory committee to the projected Rehabilitation Center at the University.

This committee asks that the House of Delegates discuss and clarify the scope of its activity. This portion of the report was adopted.

Speaker Dodds stated that he thought the president of the association could well outline the duties of this committee, and if the house wishes that this committee be a liaison committee with the Rehabilitation Center, this could be so moved.

Dr. Sorenson moved that this Committee on Geriatrics be made the liaison committee with the Rehabilitation Center at the University of North Dakota Medical School. The motion was seconded by Dr. Hammargren. Motion carried.

6. Your committee takes note of the fine and informative report submitted by the Committee on Cancer. It is a report that could well be read by every lay citizen in the state. In addition, every doctor in the state is deeply indebted to this committee for bringing to him the opportunity to meet and to hear talks by qualified doctors who are active in cancer research.

The reference committee wishes to incorporate a "thank-you" to the Committee on Cancer for the time

and effort it has expended in carrying out so extensive a program. This portion of the report was adopted.

7. Your committee has reviewed the report of the Committee on Maternal and Child Welfare. This portion of the report was adopted.

8. Your committee has reviewed the report of the Committee on Crippled Children. It is noted in this report that the committee feels that although a sufficient number of cases were referred to the Cerebral Palsy Clinic, they were not of a great enough variety to reach the requirements to give a choice of interesting and valuable cases. They ask that each doctor interest himself in this clinic and refer to it whatever cases he feels might be of value. This portion of the report was adopted.

9. Your committee has reviewed the report of the Committee on Nursing Education. This portion of the report was adopted.

It was moved by Dr. Sorenson, seconded by Dr. Sandmeyer, that the report as a whole be adopted. Motion carried.

A. R. SORENSON, M.D., chairman
R. C. PAINTER, M.D.
G. C. FOSTER, M.D.
JOHN VAN DER LINDE, M.D.

Reference Committee to Consider the Reports of the Committee on Medical Economics, Including Sub-Committees

Dr. Baumgartner, chairman, presented the following reports and their discussions, which were adopted section by section and as a whole.

1. Your committee reviewed the report of the Committee on Medical Economics and agrees that the welfare board fee schedule has proved satisfactory to date.

It is also agreed with the committee that a review of the fee schedule with the Workmen's Compensation Bureau be undertaken this year with the possibility of revision. It is felt that workmen's compensation cases should be cared for within the state whenever possible. It is noted that the Veterans Administration is carrying out their authorizations for work and disbursement satisfactorily from their office in Fargo. We feel that the Medical Economics Committee should meet at least annually. This portion of the report was adopted.

2. Your committee noted that the sub-committee on Veteran's Medical Service had no cause to function in the past year. Previously, this committee had a great many functions which were carried out admirably. However, in view of the present situation, it is recommended that this sub-committee be discontinued.

Dr. Baumgartner moved the adoption of this portion of the report. Speaker Dodds asked for further discussion regarding this committee and the response was as follows:

Dr. C. H. Peters:

I do not believe we should lose contact with the Veterans' Administration. We should keep in contact with this organization although nothing is pending at this moment.

Dr. Baumgartner:

I think this could be left with the Committee on Medical Economics.

Dr. Radl:

The change-over is one of administration and finance. Actually, when we made the change, the members representing the state medical association felt that the liaison committee should be maintained. It was at the request of the Veterans' Administration that they have some committee to act between them and the state association. For instance, a change in fee schedules—who could handle that? I believe we should have a permanent committee. You never know when something in particular might come up. In fact, it was suggested that this committee be retained without this being a sub-committee.

This report was not adopted.

3. Your reference committee has reviewed the report of the Committee on Prepayment Medical Care and is pleased to note that the committee is in close liaison with the association's disability insurance plan. It is felt that the new long-term benefit plan adds materially to the coverage.

It is noted that the committee is studying the possibility of an association plan for life insurance.

The committee should be commended for its efforts in the survey made regarding the desire of the association for malpractice insurance coverage. The reference committee concurs that the Committee on Medical Economics and the Committee on Prepayment Medical Care should study the plan very carefully from all angles.

We note that the committee has postponed its study on the evaluation of the various prepayment medical plans, as well as the uses and abuses, pending the results of the A.M.A.'s Commission on Medical Care Plans. It is felt by the reference committee that any educational program as to the uses, abuses, and necessity of prepaid medical coverage should await the results of the above study. This portion of the report was adopted.

4. Your committee noted that the Committee on Rural Health met and agreed to set up immunization booths staffed by members of district societies at each of the fairs held throughout the state in the summer of 1956. The purpose is to reach a better segment of the non-immunized population and to do a public service and public relations activity at the same time. This committee questions the advisability of this activity and requests clarification and discussion of this proposal.

Speaker Dodds asked for further discussion, noting that the chairman, Dr. Baumgartner, had made no suggestions as to how he wanted it clarified.

Dr. Baumgartner:

We felt it should certainly be discussed as to the advisability of having immunization clinics at the various fairs. For one thing, a lot of these require three shots. Where would they get the other two?

Dr. Vandergon:

This idea was in some way to get to the general public. Maybe if we give smallpox vaccination alone, it would give a service to the people, and we could hand out other literature. Some thought we could give tetanus as a start, and they would go to their doctor for the second or third shot. Some of the district societies go along with the Northwest Society on the thought that some publicity could be done through the papers. We want the public to get immunization conscious for tetanus particularly. People have not been doing that. Another plan has come up such as fitting up a float of seventy-five years of medicine. We just want to bring medicine out. We are open for suggestions at any time as to how to start working with rural people.

Dr. Peters:

I heartily concur with the idea of the education of the public in group organization, but I would question and oppose this report as it now stands on the basis that medicine should not be practiced on the fair grounds. This could be a fertile field for malpractice suits. I would like to oppose this report.

Speaker Dodds advanced the opinion that the reference committee also questioned the advisability of this.

Dr. Baumgartner re-read the report on the Committee on Rural Health and stated as follows:

Your reference committee noted that the Committee on Rural Health met and agreed to set up immunization booths, staffed by members of district societies, at each of the fairs held throughout the state in the summer of 1956. The purpose is to reach a better segment of the nonimmunized population and to do a public service and public relations activity at the same time. This reference committee questions the advisability of this activity and requests clarification and discussion of this proposal.

Speaker Dodds inquired of the chairman if he wished the report to read as opposing this.

Dr. Baumgartner:

Yes. This committee opposes the advisability of this activity.

Dr. Fischer:

I second this, which is disapproving the action of the Committee on Rural Health regarding immunization booths.

Dr. Hill asked if it would be in order to encourage the Committee on Rural Health in regard to public relations without active immunization. Dr. Boynton seconded this motion and it carried. This portion of the report was adopted.

5. Your committee reviewed the report of the Liaison Committee to the North Dakota Bar Association and noted that a well attended joint meeting of the North Dakota Medical Association and North Dakota Bar Association was held to emphasize, discuss, and clarify mutual problems. Another meeting is to be held in the fall of 1956, and we recommend that such meetings be continued and that all association members be encouraged to attend these meetings. This portion of the report was adopted.

6. Your committee noted that Dr. Woutat has been very active in his capacity as representative to the Governor's State Health Planning Committee during the past year. This committee recommended allocation of federal funds to 5 projects throughout the state. Through the efforts of the committee, federal regulations prohibiting the construction of a nursing home as an integral part of an existing domiciliary institution have been eliminated.

It is the present feeling of the State Health Planning Committee that very few, if any, new hospitals are needed in new locations throughout the state, but that a number of outmoded structures should be replaced and others renovated. It is also the feeling that more nursing home type facilities are needed. This portion of the report was adopted.

7. Your committee noted that the Liaison Committee of the North Dakota State Medical Association and the North Dakota Hospital Association held its first meeting in 1955. The reference committee concurs with the opinion that the Liaison Committee should function best as purely an advisory or technical committee. This portion of the report was adopted.

8. Your reference committee is pleased to note that members of the Committee on School Health participated in school health lectures given at four teachers' colleges last summer. This portion of the report was adopted.

Dr. Baumgartner moved for the adoption of the report as a whole, except for the fact that the sub-committee on Veterans Administration not be deleted. Dr. Boynton seconded the motion and it carried.

CARL BAUMGARTNER, M.D., chairman

F. A. HILL, M.D.

A. C. KOHLMAYER, M.D.

R. M. FAWCETT, M.D.

Speaker Dodds next introduced the report of the reference committee on the Committee on Constitution and Bylaws, with Dr. Sandmeyer acting as chairman. All members of the House of Delegates were mailed a copy of the Constitution and Bylaws, and it is assumed that all have read this and are conversant with it. The chairman, Dr. Sandmeyer, was called upon to present the report on the changes in the constitution.

Dr. Sandmeyer: Your reference committee has reviewed the report of the Committee on Constitution and Bylaws. We met with the Council and with Dr. R. B. Radl, the chairman of this committee. We approve the proposed changes in the constitution of the North Dakota State Medical Association.

The reference committee, at this time, asked Dr. Radl to present and explain the additional changes this committee has made since the copies were printed and sent to the Delegates of the House.

Dr. R. B. Radl: Proposed changes in constitution of North Dakota State Medical Association.

Dr. Sandmeyer:

CONSTITUTION

ARTICLE I

Name of the association

No change.

ARTICLE II

Purposes of the association

No change.

ARTICLE III

Component societies

No change.

ARTICLE IV

Composition of the association

Section 1. No change.

Section 2. No change.

Section 3. Associate members. Physicians teaching in any regular medical school, hospital residents and interns in an approved North Dakota hospital and in no manner engaged in the private practice of medicine and not otherwise eligible to regular membership may become associate members of this association, when elected associate members of the component society of the district in which said teachers, residents, and interns live. Such members shall be designated associate members; and they shall enjoy the same privileges as regular members except the right to vote or to be elected to office. They shall be charged no dues.

Section 4. Honorary members. Any reputable physician who has been practicing medicine for a period of fifty years after graduation from medical school shall be eligible to honorary membership without payment of dues upon election to honorary membership by his local society and approval by the state association through its House of Delegates.

ARTICLE V

House of Delegates

No change.

ARTICLE VI

The Council

Section 1. The Council shall be the executive body of the association and shall consist of one councillor from each councillor district, and the immediate past president of the association as councillor at large. The term of office of the councillor at large shall be until the president currently in office becomes a retiring president. The secretary and the president of the state association shall be ex-officio members of the Council. Besides its duties mentioned in the Bylaws, the Council shall have charge and control of all the property of this association of whatsoever nature and of all the funds from whatsoever source. The Council shall have full authority and power of the House of Delegates between the annual sessions unless the House of Delegates shall be called into a special session as provided for in the Bylaws.

Section 2. No change.

Section 3. No change.

Section 4. The Council shall formulate rules governing the expenditure of money to meet the necessary running expenses and fixed charges of the association as well as such other rules governing its actions as it may deem necessary or desirable. A majority of council members shall constitute a quorum for the transaction of business. The Council shall recommend to the House of Delegates at the second session of the annual session the amount of per capita dues required by the budget established by the Council for the ensuing year.

ARTICLE VII

As in present constitution to be deleted.

Proposed ARTICLE VII

Councillor districts and district medical societies

There shall be established numbered councillor districts as follows:

1. To include the counties of Cass, Richland, and Ransom, and the district medical society therein to be known as the First.

2. To include the counties of Rolette, Towner, Pierce, Benson, Ramsey, Eddy, Foster, and the western part of Nelson, and the district medical society therein to be known as the Second.

3. To include the counties of Cavalier, Pembina, Walsh, Grand Forks, and the eastern part of Nelson, and the district medical society therein to be known as the Third.

4. To include the counties of Burke, Mountrail, the northern part of McLean, Renville, Ward, Bottineau, McHenry, and Wells and the district medical society therein to be known as the Fourth.

5. To include the counties of Barnes and Griggs, and the district medical society therein to be known as the Fifth.

6. To include the counties of Mercer, Oliver, the southern part of McLean, Sheridan, Morton, Burleigh, Kidder, Grant, Sioux, Emmons, Logan, and McIntosh, and the district medical society therein to be known as the Sixth.

7. To include the counties of Stutsman, LaMoure, Dickey, and Sargent and the district medical society therein to be known as the Seventh.

8. To include the counties of Divide, Williams, and McKenzie, and the district medical society therein to be known as the Eighth.

9. To include the counties of Dunn, Stark, Adams, Hettinger, Bowman, Slope, Billings, and Golden Valley, and the district medical society therein to be known as the Ninth.

10. To include the counties of Traill and Steele, and the district medical society therein to be known as the Tenth.

ARTICLE VIII

Sessions and meetings

Section 1. The association shall hold an annual session at which time shall be held meetings of the Council and of the House of Delegates. There shall also be held not less than two general meetings which shall be open to all registered members and guests.

Section 2. No change.

Section 3. (Delete. See Chapter II of the Bylaws.)

ARTICLE IX

Officers

Section 1. No change.

Section 2. The president, president-elect, vice-presidents, secretary, and treasurer shall be elected annually by the House of Delegates to serve for a term of one year. The councillors shall be elected by the House of Delegates annually to serve for a term of three years, but a councillor shall not serve more than three full terms.

Section 3. The speaker of the House of Delegates shall be elected by the House of Delegates at its second session of each year. The vice-speaker of the House of Delegates shall be elected for a two-year term by the House of Delegates at its second session on alternate years. Each may, but need not be, elected from among the members of the House of Delegates.

ARTICLE X

Funds and expenses

Funds shall be raised by an equal per capita assessment on each member of each component society. The amount of the assessment shall be fixed by the House of Delegates.

ARTICLE XI

Referendum

No change.

ARTICLE XII

The seal

The association shall have a common seal. The House of Delegates by a two-thirds vote of delegates registered at the annual session shall have power to break, change, or renew the seal.

ARTICLE XIII

Amendments

The House of Delegates may amend any article of this constitution by: (1) a two-thirds vote of the delegates registered at the annual session, provided that such amendment shall have been presented at a session of the House of Delegates at the previous annual session; or: (2) provided an amendment shall have been submitted by the chairman of the Council and shall have been published in the official journal of the association not less than three months before the meeting at which final action is to be taken, and it shall also have been sent by the chairman of the Council to each component society not less than three months before the annual session at which final action is to be taken.

Dr. Sandmeyer:

I move the adoption of this portion of this report.

Dr. F. A. Hill:

I second this.

Speaker Dodds:

If we approve of this change, it will have to lay over one year. All those in favor of changing the Constitution as presented, signify by saying aye. Opposed? The motion carried.

Dr. Sandmeyer:

The committee has reviewed the report of the Committee on Constitution and Bylaws and has approved the suggested revision of the Bylaws. We ask Dr. Radl at this time to present to the House of Delegates the changes that have been made by this committee since the printing and mailing of this revision to the delegates.

Dr. Radl: Suggested revision of the bylaws.

CHAPTER I

Membership

Section 1. All members of the component societies in good standing shall be privileged to attend all meetings and take part in all of the proceedings of the annual sessions and shall, except for associate and honorary members, be eligible to any office within the gift of the association.

Section 2. A physician listed upon the properly certified roster of members of a component medical society, who has in his possession a properly certified membership card for the current year in the North Dakota State Medical Association, shall have the right to register at the annual or special sessions of this association.

Honorary members, associate members, physicians teaching in any regular medical school, hospital residents, interns, and medical students may register as guests.

Section 3. No change.

Section 4. Each member in attendance at the annual session shall enter his name and address and the component society of which he is a member in the registration book. No member or delegate shall take part in any proceedings of an annual session until he has complied with the provisions of this section.

Section 5. If the annual report and dues of a component society are not received by the secretary of the state association for two consecutive years, then the charter of that society shall be automatically revoked and the secretary of the state association shall notify the secretary of that component society to that effect.

CHAPTER II

Annual and Special Sessions of the Association

Section 1. The annual session shall be held for four consecutive days beginning on a Saturday, which period of time shall include the first Sunday in May.

Section 2. Special sessions of either the association or the House of Delegates may be called by the president or the Executive Committee of the Council, if all members of that Executive Committee vote in the affirmative, or on petition of two-thirds of the total number of delegates in the association.

Notices of such special sessions shall be mailed to all officers of the association and to the president and secretary of each component society at least thirty days before the date of the special session. The secretary of each component society shall notify the delegates of that society immediately of the special session. All notices shall include information as to the purpose or purposes of the special session, time, date, and location.

Section 3. The fiscal year of this association shall be the calendar year, that is, January 1 to December 31 of each year.

Section 4 (added). The House of Delegates and the Council shall meet annually at the time and place of the annual session of the association.

CHAPTER III

General Meetings

Section 1. The general meetings shall be held on at least two days of the annual session. All registered members and guests shall be invited to these meetings. Each general meeting shall be presided over by the president, or, in his absence or disability, by the president-elect or one of the vice-presidents.

At the general meetings, the scientific sessions and presentations shall be delivered. No business of the association shall be transacted at a general meeting except in the case of a referendum.

Section 2. Delete.

Section 3. Delete.

CHAPTER IV

House of Delegates

Section 1. No change.

Section 2. Each component society shall be entitled to send to the House of Delegates each year, 1 delegate for each 15 members and 1 for each major fraction thereof, but each district society holding a charter from this association, which has made its annual report and paid its assessments as provided in this Constitution and Bylaws, shall be entitled to 1 delegate. In case a regularly elected delegate or alternate is unable to attend the annual meeting of the association, the speaker of the House of Delegates may appoint a substitute from the local society who shall have the rights and privileges of the regular delegates. Alternates may be seated in the House of Delegates but shall not be entitled to vote if the delegate for whom they are an alternate is present.

Section 3. No change.

Section 4. No change.

Section 5. No change.

Section 6. No change.

Section 7. No change.

Section 8. No change.

Section 9. No change.

Section 10. Delete.

CHAPTER V

Election of Officers

Section 1. All elections shall be by ballot and a majority of the votes cast shall be necessary for election, but if there is only 1 nomination for an office, the election may be made by acclamation upon unanimous consent of the members of the House of Delegates present and voting without ballot.

Section 2. At the first meeting of the House of Delegates at the annual session, the president of this association shall announce the names of the members of a nominating committee of 3 which shall submit its report to the House of Delegates at the second session of the annual session.

Section 3. Delete.

Section 3 (Previously Section 4). Nothing in this chapter shall be construed to prevent additional nominations by members of the House of Delegates for offices in the association; the speaker or the vice-speaker, whichever is presiding, shall call for such nominations after the report of the Nominating Committee has been received before an officer has been elected.

CHAPTER VI

Duties of Officers

Section 1. The president shall preside at all general meetings

of the association; appoint all committees not otherwise provided for; deliver an annual address at such time as may be arranged; and perform such other duties as custom and parliamentary usage may require. He shall be the real head of the profession of the state during his term of office and, as far as practicable, visit and attend meetings of the component medical societies. On such occasions, he shall also visit the appropriate councillors in an endeavor to become familiar with medical conditions and to assist in any problems they may have. He shall be ex-officio a member of the Council and of all committees.

Section 2. No change.

Section 3. No change.

Section 4. The secretary shall attend the general meetings of the society and the House of Delegates and keep minutes of their respective proceedings in separate record books. He shall also attend all meetings of the Council. He shall be custodian of all record books and papers belonging to the society, except such as properly belong to the treasurer, and shall keep account of and turn over monthly to the treasurer all funds of the society which he receives. He shall provide for the registration of the members and delegates at the annual sessions. He shall, with the cooperation of the secretaries of the component societies, keep a card-index register of all the legal practitioners of the state by counties, noting on each his status in relation to his local society and, on request, shall transmit a copy of this list to the American Medical Association. He shall aid the councillors in the organization and improvement of the local societies and in the extension of the power and usefulness of this society. He shall conduct the official correspondence, notifying members of meetings, officers of their selection, and committees of their appointment and duties. *He shall employ such assistants as may be ordered by the Council including a part- or full-time executive secretary.* The secretary's report shall cover the fiscal year. He shall supply each component society with the necessary blanks for making their annual report; keep an account with the component societies, charging against each society its assessment, collect the same, and at once turn it over to the treasurer. Acting with the Committee on Scientific Work, he shall prepare and issue all programs. The amount of his salary shall be fixed by the Council. He shall give bond in such sum as the Council may demand, such bond to be procured from some reliable security company by the Council and to be approved by the Council. The expense of such bond shall be paid by the state association.

Section 5. No change.

Section 6 (To be added). Executive secretary. An executive secretary, full- or part-time, may be employed as ordered by the Council. The salary of the executive secretary and office assistants of the executive secretary shall be fixed by the Council. The executive secretary shall give bond in such amount as the Council directs, such bond to be procured from some reliable security company by the Council and to be approved by the Council. The expense of such bond shall be paid by the state association. Office space shall be ordered by the Council for the executive secretary and such assistants as are necessary.

The duties of the executive secretary shall be those as ordered and delegated to him by the president of the association, the chairman of the Council, the secretary of the state association, other officers of the state association, and chairmen of various committees, both standing and special. The executive secretary shall have the authority to act as representative of the association when so directed by the president. This authority shall apply particularly to official contact with organizations related to the practice of medicine or to lay group organizations or members of such lay group organizations, including members of the North Dakota legislature. The executive secretary shall be of particular assistance for arrangements for the annual session or for special sessions of the association, the Council, or the House of Delegates.

The executive secretary shall give a report of his official activities and those of his office at the annual session of the association, or as requested by the president or the secretary of the association or the chairman of the Council. This report shall include a financial report which shall be subject to audit upon order of the Council. He shall submit his accounts to such examination as the Council may order.

CHAPTER VII

The Council

Section 1. The Council shall hold meetings during the annual session of the association and at such times as necessity may require, subject to the call of the president of the association or the chairman of the Council, or on petition of 3 councillors. It shall keep a permanent record of its proceedings at all meetings. It shall, during its meetings at the annual session elect a chairman, vice-chairman, and secretary. The chairman of the Council shall appoint an Executive Committee to function during the ensuing year. It shall, through its chairman, make an annual report to the House of Delegates at the first meeting of the House of Delegates at the annual session. This report shall include an audit of the accounts of the secretary and treasurer and other agents of this association and shall also specify the character and cost of all the publications of the association during the year, the amount of

all other property belonging to the association or under its control, with such suggestions as it may deem necessary. In the event of a vacancy in any elective office, the Council may fill the same until the next annual election.

Section 2. Each councillor shall be organizer, peacemaker, and censor for his district. He shall attend, so far as is possible, all meetings of the component societies in his district, keep advised of the general conditions of the component societies, and attempt to improve the zeal of these societies. He shall make an annual report of his activities and of the condition of the profession of each component society in his district to each annual session of the House of Delegates. The necessary traveling expenses incurred by such councillor in the line of the duties herein imposed may be allowed by the House of Delegates after approval by the Council as a whole upon a properly itemized statement, but this shall not be construed to include his expense in attending the annual session of the association.

Section 3. Collectively the Council shall be the board of censors of the association and shall also act as a mediation committee. It shall consider questions referred to it by the board of censors of a component medical society; it shall accept for consideration an appeal by a physician member of a component medical society who disagrees with the decision of the component society involved; it shall likewise accept for consideration an appeal by one of the lay public who has placed a matter of concern to the component medical society and is dissatisfied with the action and decision of the component medical society. In addition, the Council shall consider matters of concern which may be considered intercomponent society matters or problems which affect hospitals or hospital personnel affecting intercomponent societies. The decision of the Council in all cases shall be final.

Section 4. No change.

Section 5. No change.

CHAPTER VIII Committees

Section 1. No expenses shall be incurred by any committee or committeemen or by the secretary or the secretary's office without first receiving proper authority from the Council.

Section 2. The standing committees of the North Dakota State Medical Association shall be:

1. Committee on Scientific Program
2. Committee on Medical Education
3. Committee on Necrology and Medical History
4. Committee on Public Health
5. Committee on Nursing Education
6. Committee on Maternal and Child Welfare
7. Committee on Crippled Children
8. Committee on Public Relations
9. Committee on Legislation
10. Committee on Official Publication
11. Committee on Medical Economics
12. Committee on Veterans Medical Service
13. Committee on Prepayment Medical Care
14. Committee on Rural Health
15. Committee on Cancer

Section 3. Special committees may be appointed annually by the president. It is suggested that the president consider annually the formation of special committees as follows:

1. Committee on Geriatrics and Rehabilitation
2. Committee on Diabetes
3. Committee on Mental Health
4. Committee on Constitution and Bylaws
5. Committee on Foreign Trained Physicians.
6. Committee on Emergency Medical Service
7. Committee on American Medical Education Foundation
8. Liaison Committee to North Dakota Hospital Association
9. Liaison Committee to North Dakota State Pharmaceutical Association
10. Liaison Committee to State Bar Association
11. Advisory Committee to Public Assistance Division of the Public Welfare Board
12. Committee on School Health
13. Nominating Committee

Section 4. Same as present Section 1.

Section 5. (*Changes the present Section 2*). The Committee on Arrangements shall consist of the local society in the territory in which the annual session is to be held. It shall, by committees of its own selection, cooperate with and aid the Council in procuring suitable accommodations for the meeting places of the association, of the House of Delegates, of the Council, and of their respective committees and shall cooperate with and aid the Council in all arrangements. It shall hold its first meeting on or before the second Tuesday in October for the purpose of making general arrangements for the session. Its chairman shall report an outline of the arrangements to the secretary for publication in the program and shall make additional announcements during the session as occasion may require.

Section 6. (*Present Section 3*). No change except that it will be numbered differently.

Section 7. (*Present Section 4*). No change except that it will be numbered differently.

Present Section 5 deleted.

CHAPTER IX Assessments and Expenditures

Section 1. The annual assessment per capita shall be fixed by the House of Delegates at each annual session of the state association. The secretary of each component society shall forward its assessment together with its roster of all officers and members, list of delegates, and list of nonaffiliated physicians of the county or district to the secretary of this association not later than the first day of March in each year.

Section 2. No change.

Section 3. No change.

Section 4. No change.

Section 5. No change.

Section 6. Exceptions to the per capita annual assessment are as follows:

a. Members of the association not in active practice, whether residing in or outside of North Dakota, shall be assessed \$10.

h. Members of the association who have left North Dakota and return to active practice in North Dakota shall be charged pro rata of the annual per capita assessment for the current year on this basis: the full assessment if they return to active practice in the first half of the current fiscal year, and one-half of the full assessment if they return to practice in the second half of the current fiscal year.

c. Members who are totally and permanently disabled for medical practice by reason of physical or mental incapacity shall be exempt from any annual assessment. Such members shall not have the right to vote or to hold office and shall not receive the official publication of the association without charge; if they do wish the official publication, they may receive it for the charge which is made by the publishing agency to the state association.

d. (*changed to present c.*)

CHAPTER X Rules of Conduct

No change.

CHAPTER XI Rules of Order

No change.

CHAPTER XII District Societies

Section 1. No change.

Section 2. No change.

Section 3. No change.

Section 4. No change.

Section 5. Each component society shall elect a board of censors of 3 physicians, each to serve a term of three years and the terms to be staggered. Vacancies on the board of censors shall be replaced at the annual election meeting of each component society. In addition to judging the qualifications of applicants for admission to the society, the board shall review and act upon matters or questions involving the relationship of members to each other or to hospitals or to hospital personnel in which members of the component society practice; and shall likewise review and act upon matters or questions or complaints brought to it by a member of the lay public which may affect either a physician, a hospital, or hospital personnel in the geographic limits of the component society. The authority of the board of censors of a component society shall be restricted to matters concerning the members of the particular component society or geographic limits of the component society. It may thus be stated that their function concerns intracomponent society matters.

Conciliation shall be sought, but there shall be no compromise with truth or equitable justice. The board of censors may refer the case to the Council of the state association. The physician member of the component medical society on whose case the board of censors has acted may appeal the action of the board of censors to the Council of the state association.

Section 6. Delete.

Section 7. No change except that it will now be numbered Section 6.

Section 8. No change except that it will now be numbered Section 7.

Section 9. (*now to be numbered Section 8*). At its annual election of officers, each local society shall elect a delegate and should elect an alternate delegate for each elected delegate to represent it in the House of Delegates of this association in the proportion of 1 delegate to each 15 members or major fraction thereof. The secretary of the local society shall send a list of such delegates and alternates to the secretary of this association immediately after the annual election meeting and at least sixty days before the annual session of this association.

Section 10. (*now to be numbered Section 9*). The secretary of each local society shall keep a roster of its members and a list of nonaffiliated registered physicians of the district in which shall be shown the full name, address, college and date of graduation, date of license to practice in this state, and such other information as deemed necessary. He shall furnish an official report contain-

ing such information upon blanks supplied to him to the secretary of this association immediately after the annual business and election meeting and at least sixty days before the annual session of this association. In keeping such roster, the local secretary shall note any change in the personnel of the profession by death or by removal to or from the district, and, in making his annual report, he shall be certain to account for every physician who has lived in the district during the year.

(Present Section 10 is changed to 9).

CHAPTER XIII Mediation Committee

Section 1. Collectively the Council shall be the Mediation Committee of the association. The chairman of the Council shall act as chairman of the Mediation Committee. In some instances, the action of the Council as a Mediation Committee will closely parallel its activities as a board of censors of the association. A majority of the members of the Mediation Committee shall constitute a quorum for the transaction of business.

Section 2. The purpose of the Mediation Committee is to prevent or resolve misunderstandings, to clarify and adjust differences between physicians, between physician and a patient, and between physician and hospitals or hospital personnel to assist in maintaining the high levels of professional deportment. To achieve these purposes, the Mediation Committee shall have the authority to receive complaints, to investigate, to mediate, to arbitrate, and to render decisions. The decision of the Mediation Committee shall be considered as final. The Committee shall act on what may be called an intercomponent society level with respect to complaints or problems affecting physicians, hospitals, or hospital personnel or members of the lay public. If, in the judgment of the chairman of the Mediation Committee or the committee acting as a whole, it is felt that the matter should be referred to the board of censors of a component society, it shall so recommend. However, the board of censors of the component society or a physician or any lay person may appeal from the action of the component society to the Mediation Committee.

Section 2. The committee will respect the confidential nature of any complaint. Every complainant will be invited to present fully his complaint by letter or by appearance before the committee, with the assurance that his identity and the nature of his complaint will be kept confidential to the fullest degree consistent with adequate investigation of the complaint. However, should any formal prosecution result, the committee will of necessity reveal the names of prospective witnesses, even though these names may include that of the complainant. However, if it seems expedient, the committee or its chairman shall have the power to request but not to force any complainant and any association member complained against to face each other during the course of the investigation or hearing, formal or informal, relative to any matter under investigation and to examine and interrogate each other.

Section 3. The chairman of the committee may, at his discretion, acknowledge receipt of all complaints in writing as the circumstances of each case may suggest. He will arrange for meetings of the committee with such frequency as may be necessary so that investigation of each complaint is carried out with reasonable dispatch and will notify complainants and any other persons whom the committee wishes to interview concerning meeting dates and places.

Section 4. The chairman shall determine whether investigation or action on the complaint should be carried on formally by the whole committee at a meeting, or by one or more members of the committee individually. At the discretion of the chairman, the preliminary investigation may be made by a member of the committee from a district other than that in which the complaint originates.

Section 5. When an informal investigation like that referred to above has convinced a member of the committee, other than the member in whose district the complaint arose, that no disciplinary action is indicated and that both the complainant and the physician involved signify in writing that they are willing to accept the conciliation agreement, the advice and suggestions of said committee member shall be reduced to writing and supplied to both complainant and the physician concerned, over the signature of the chairman of the committee.

Section 6. When investigation convinces any member of the committee that disciplinary action is indicated, the entire committee shall consider the matter formally in meeting before further action is taken and further action shall be determined by majority vote of those present. Conciliation shall be considered. Disciplinary action may consist of recommendations that the hospital concerned should consider whether the physician be denied hospital privileges, whether the physician concerned be dropped from the rolls of the component society and from the rolls of the North Dakota State Medical Association, and suggestions to the North Dakota State Board of Medical Examiners for suspension or revocation of his license.

Section 7. When the matter concerns a matter of medical or surgical fees and if after investigation and attempts to affect an amicable settlement, the committee is unable to reconcile differ-

ences over the particular fee charged by an association member, the committee shall by a majority vote determine the fee which it deems fair and proper. Failure of the member to agree to such determination shall constitute grounds for action as indicated in Section 6 of this chapter of the Bylaws.

Section 8. Whenever the committee determines to file formal charges against a member of the association, the charges shall be reduced to writing and filed over the signature of the chairman of the committee and over the typed signatures of all other members of the committee who have taken part in the proceedings.

Section 9. The chairman of the committee shall keep appropriate and sufficient records of all of its final actions, other than confidential matters, and shall prepare an annual report and recommendations to the House of Delegates of the North Dakota State Medical Association.

Section 10. Meetings of the committee shall be called by the chairman when it appears necessary for the entire committee to consider any complaint referred to it for adjudication and at such other times as may be necessary to consider other business within the scope of the activities of the committee.

Section 11. Decisions arrived at by a majority of the Mediation Committee shall be considered the expression of the entire committee.

CHAPTER XIV Amendments

These Bylaws may be amended at any annual session by a two-thirds vote of all delegates present at that session. Any such amendment may be introduced at any session of the House of Delegates but shall be laid upon the table for that current session and acted upon at any later session of the House of Delegates.

ORDER OF BUSINESS OF THE HOUSE OF DELEGATES FIRST SESSION

1. Call to order
2. Report of Committee on Credentials
3. Roll call
4. Reading of the minutes of the last meeting
5. Report of the president
6. Report of the secretary
7. Report of the treasurer
8. Report of the chairman of the Council
9. Report of the councillors
10. Reports of the standing committees
11. Report of the delegate to the American Medical Association
12. Reports of special committees
13. Announcement of names of members of Nominating Committee
14. Call for unfinished business
15. Call for new business
16. Adjournment

SECOND SESSION

1. Call to order
2. Roll call
3. Reading of minutes of last meeting
4. Unfinished business
5. New business
6. Resolutions
7. Fixing the per capita dues for the ensuing year
8. Report of the State Board of Medical Examiners
9. Selection of location of city of the next annual session
10. Report of Nominating Committee and election of officers
11. Adjournment

Upon completion of the presentation of the proposed changes in the Constitution and Bylaws, Speaker Dodds asked for a general discussion on the various points.

One point in question was the section dealing with the date of the annual meeting, Chapter 11, Section 1, which states "The Annual Session shall be held for four consecutive days beginning on a Saturday and which period of time shall include the first Sunday in May." It was felt that this is the most suitable time for the meetings to be held, and inasmuch as the meetings are held in the 4 major cities in the state, the necessary arrangements for meeting places could be made well in advance to avoid conflict in securing necessary facilities.

One other point was emphasized, that being the dates of the fiscal year of the association, which in the revision of the Bylaws shall be the calendar year, January 1 to December 31.

It was moved by Dr. Sandmeyer and seconded by Dr. Baumgartner that this portion of the report be adopted. Speaker Dodds clarified the motion which is to adopt the Bylaws as presented. There being no further discussion

on the motion, a vote was called for and the motion carried.

J. A. SANDMEYER, M.D., chairman
F. A. DeCESARE, M.D.
A. F. HAMMARGREN, M.D.
R. W. HENDERSON, M.D.

Speaker Dodds asked for an adjournment of the House of Delegates for five minutes to reconvene this same afternoon. This would constitute the third session of the House of Delegates. Adjournment.

THIRD SESSION. HOUSE OF DELEGATES

Sunday Afternoon, June 3, 1956

Alonzo Ward Hotel, Aberdeen, South Dakota

The third session of the House of Delegates was called to order at 3:30 P.M. in the Alonzo Ward Hotel, Aberdeen, on June 3, 1956.

Secretary Boerth called the roll. A quorum was present and the following doctors responded to the roll:

Drs. G. W. Toomey, Devils Lake; R. M. Fawcett, alternate, Devils Lake; C. C. Foster, Fargo; L. E. Wold, Fargo; D. G. Jaehning, alternate, Wahpeton; R. C. Painter, Grand Forks; Bruce Boynton, Grafton; A. C. Kohlmeyer, Larimore; F. A. Hill, Grand Forks; J. A. Sandmeyer, Grand Forks; A. F. Hammargren, Harvey; V. J. Fischer, Minot; A. R. Sorenson, Minot; N. A. Macdonald, alternate, Valley City; R. W. Henderson, Bismarck; Carl Baumgartner, Bismarck; C. H. Peters, Bismarck; Keith Foster, Dickinson; Richard Raasch, alternate, Dickinson; T. E. Pederson, Jamestown; John Van der Linde, Jamestown; R. W. McLean, Hillsboro; J. D. Craven, Williston. There were 23 doctors present.

As the first order of business, the chair called upon Dr. Sandmeyer, chairman of the reference committee on the Committee on Constitution and Bylaws. Dr. Sandmeyer moved the adoption of the suggested revision of the Bylaws, and Dr. Craven seconded the motion. The motion carried, and the Bylaws as presented are now officially in effect and shall carry from this time on.

Reference Committee on Resolutions

Dr. Peters, chairman of the committee, presented the following resolutions:

RESOLUTION

Whereas, Dr. F. Daniels Gillis, president of the South Dakota Medical Association, has for the past several years served his profession, his state, and nation with unsurpassed skill and dignity, and

Whereas, Dr. Gillis has put in much time and effort in plans and preparations for the seventy-fifth anniversary of the South Dakota and North Dakota State Medical Associations, and

Whereas, the untimely passing of this leader in South Dakota medicine has deprived this meeting of his inspired leadership,

Now, therefore, be it resolved: that the House of Delegates of the North Dakota State Medical Association extend to the family, his colleagues, and his association our sincere sympathy in their loss and ours, and

Be it further resolved: that a copy of this resolution be directed to the president of the South Dakota State Medical Association. This resolution was adopted.

RESOLUTION

Whereas, the members of the North Dakota State Medical Association attending the sixty-ninth annual meeting of the association, held in Aberdeen, South Dakota, in conjunction with the seventy-fifth anniversary of the South Dakota State Medical Association, have enjoyed the hospitality and kindness of this fair city, and

Whereas, the mayor of Aberdeen and his associates, the press and radio, the hotels and businessmen have made this session one long to be remembered,

Now, therefore, be it resolved: that the House of Delegates express their appreciation by directing a copy of this resolution to the honorable mayor. This resolution was adopted.

RESOLUTION

Whereas, the Woman's Auxiliary of the North Dakota State Medical Association has, through various projects entailing continuous work and effort, raised a sum of approximately \$10,000 for their medical student loan fund at the Medical School of the University of North Dakota, and

Whereas, this fund has been of inestimable value to many medical students and to the medical school, and

Whereas, other worthwhile projects such as mental health and nurse recruiting improve the practice of medicine in North Dakota,

Now, therefore, be it resolved: that the Council and the House of Delegates of the North Dakota State Medical Association convey to the Woman's Auxiliary of the association their appreciation and thanks for their excellent work and vision in this splendid project, and

Be it further resolved: that a copy of this resolution be directed to the president of the Woman's Auxiliary. This resolution was adopted.

RESOLUTION

Whereas, the exhibitors have shown great effort and interest in this meeting and former meetings in developing their exhibits and adding to the scientific interest,

Now, therefore, be it resolved: that the North Dakota State Medical Association extend to them our hearty welcome and thanks, and

Be it further resolved: that a copy of this resolution be sent to each exhibitor. This resolution was adopted.

RESOLUTION

Whereas, the members of the North Dakota State Medical Association attending the sixty-ninth annual meeting of the association have thoroughly enjoyed and profited by the scientific program developed and presented by the combined Scientific Program Committees of the South Dakota and North Dakota state medical associations, and

Whereas, the South Dakota Scientific Program Committee has provided the leadership and put forth a major effort in its development and success, and

Whereas, the Committee on Local Arrangements has excelled in providing the North Dakota State Medical Association with the niceties of a gracious convention,

Now, therefore, be it resolved: that the assembled delegates demonstrate their appreciation by a rising vote of thanks, and

Be it further resolved: that a copy of this resolution be directed to the president and executive secretary of the South Dakota State Medical Association. This resolution was adopted by a rising vote of thanks.

RESOLUTION

Whereas, the regents of the University of Minnesota will confer the school's "Outstanding Achievement Award" for distinguished alumni on the American Medical Association trustee, Dr. L. W. Larson, and

Whereas, Dr. Larson has been president of the North Dakota State Medical Association and active in its many functions and brought honor to this association,

Now, therefore, be it resolved: that this association take cognizance of this honor bestowed on Dr. Larson and join in congratulating him on this award, and

Be it further resolved: that a copy of this resolution be forwarded to Dr. Larson. This resolution was adopted.

RESOLUTION

Whereas, Dr. Archie D. McCannel is 77 years old today, and

Whereas, he has long been active in the affairs of our association and a past president of the association and has added much to the richness of our past history and contributed much to the efficiency of our organization, and

Whereas, Dr. McCannel is unable to be with us today due to unavoidable circumstances, and

Whereas, this is his first absence from the annual meetings in many years which has deprived us of his friendship and counsel,

Now, therefore, be it resolved: that the North Dakota State Medical Association, its officers, and members join in recognizing him as a leader and wish him a speedy recovery.

Be it further resolved: that a copy of this resolution be sent to Dr. McCannel. This resolution was adopted.

Dr. Peters moved the adoption of the report as a whole. Dr. Hill seconded the motion and it carried.

C. H. PETER, M.D., chairman

V. J. FISCHER, M.D.

G. W. TOOMEY, M.D.

There being no further new business, Speaker Dodds next introduced Dr. Halliday to the House. Dr. Halliday:

There are two things I would like to bring to your attention. That is, first of all, I would like to have this House of Delegates take cognizance of the tremendous amount of work that has been put in by the Committee on Constitution and Bylaws. Dr. Radl, Dr. Boerth, and Dr. Dodds have worked most diligently to supply you with these revised changes in the Constitution and Bylaws. I would like to suggest that we offer applause for the time and effort they have spent in drafting these changes.

Another thing, I do not believe all of us realize the amount of work that has been put in by Dr. Haunz, president of the Blue Shield board of directors. I want to commend the officers and doctors who are managing the plan of Blue Shield. To them, too, I would extend loud applause for their diligent work.

Speaker Dodds suggested that the remarks made by Dr. Halliday regarding the officers and doctors on the Blue Shield program be submitted to them by letter.

The next order of business was the annual report of the secretary of the State Board of Medical Examiners, Dr. C. J. Glaspel.

This was followed by the presentation of the report of the Nominating Committee and given by the secretary, Dr. Boerth.

NOMINATING COMMITTEE REPORT

President R. H. Waldschmidt, M.D., Bismarck
 President-elect R. W. Rodgers, M.D., Dickinson
 First vice-president O. A. Sedlak, M.D., Fargo
 Second vice-president J. C. Fawcett, M.D., Devils Lake
 Speaker of the House of Delegates

G. A. Dodds, M.D., Fargo—1957
 Vice-speaker of the House of Delegates

R. E. Leigh, M.D., Grand Forks—1958
 Secretary E. H. Boerth, M.D., Bismarck
 Treasurer E. J. Larson, M.D., Jamestown
 Delegate to the American Medical Association

W. A. Wright, M.D., Williston
 Alternate delegate to the American Medical Association
 T. E. Pederson, M.D., Jamestown

Councillors:

First district V. G. Borland, M.D., Fargo—1959
 Third district N. A. Youngs, M.D., Grand Forks—1959

Dr. R. B. Radl, who has served so admirably on the Council, for his own good reasons, did not wish to be considered again. The Nominating Committee, therefore, nominated Dr. C. H. Peters to serve as councillor from the sixth district.

Board of medical examiners:

Joseph Sorkness, M.D., Jamestown; O. W. Johnson, M.D., Rugby; and H. L. Reichert, M.D., Dickinson
 Medical Center Advisory Council, member

P. H. Woutat, M.D., Grand Forks
 Governor's State Health Planning Committee

P. H. Woutat, M.D., Grand Forks
 State Health Council

O. W. Johnson, M.D., Rugby
 Dr. Sorenson moved that the Nominating Committee Report be adopted unanimously. This was seconded by Dr. Baumgartner and motion carried.

C. J. GLASPEL, M.D., chairman
 JOSEPH SORKNESS, M.D.
 V. J. FISCHER, M.D.

Speaker Dodds thanked the members of the House for their time and effort. He suggested that the delegates from each society should decide among themselves that one of the group should give a report at their next society meeting, so that all the members would be familiar with the proceedings.

Dr. J. C. Fawcett, the newly elected second vice-president, offered his resignation as councillor, the term expiring in 1958. Dr. Foster made the motion, seconded by Dr. Hill, that his resignation be accepted. Motion carried. Dr. C. J. Glaspel, chairman of the Nominating Committee, submitted the name of Dr. G. W. Toomey from Devils Lake as councillor from the second district and the name of Dr. R. F. Gilliland, Dickinson, as the second member of the State Health Council. Dr. Toomey's nomination is for the unexpired term of Dr. J. C. Fawcett. This would, therefore, be a two-year term. Dr. Fischer moved that the nominations be closed and that the secretary cast a unanimous ballot for the election of these two men. Dr. Boynton seconded the motion and it carried.

There being no further business to bring before the House of Delegates, the speaker of the House, Dr. Dodds, declared the session adjourned sine die.

SCIENTIFIC PROGRAM

Monday, June 4, 1956

Civic Arena, Aberdeen, South Dakota

- 9:00 to 9:30 a.m.—Film: "Total Right Hepatic Lobectomy" (courtesy E. R. Squibb).
- 9:30 to 10:00 a.m.—"The Pathologist's Responsibility in the Diagnosis and Treatment of Cancer," Lauren V. Ackerman, M.D., Washington University, St. Louis.
- 10:00 to 10:30 a.m.—"Roentgen Diagnosis of the Acute Abdomen," Roger A. Harvey, M.D., University of Illinois.
- 10:30 to 11:00 a.m.—Recess to view exhibits.
- 11:00 to 11:30 a.m.—"Acute Surgical Abdomen," Arnold S. Jackson, M.D., Madison, Wisconsin.
- 11:30 to 12:00 noon—"Diseases of the Thyroid," Rupert B. Turnhull, M.D., Cleveland Clinic.
- 12:00 to 1:45 p.m.—Noon luncheons (Radiology, Surgery, EENT).
- 2:00 to 2:30 p.m.—"Laryngeal and Tracheal Emergencies in the Newborn and Young Infant," Alden H. Miller, M.D., Los Angeles.
- 2:30 to 3:00 p.m.—"Changing Concepts in the Surgical Treatment of Cancer," Rupert B. Turnhull, M.D., Cleveland Clinic.
- 3:00 to 3:30 p.m.—Recess to view exhibits.
- 3:30 to 5:00 p.m.—Cancer forum: moderator, Leonard Larson, M.D., trustee, American Medical Association; participants: Lauren V. Ackerman, M.D., pathologist; Roger Harvey, M.D., radiologist; and Arnold S. Jackson, M.D., surgeon (presented in cooperation with the North and South Dakota chapters of the American Cancer Society).
- 5:45 to 6:45 p.m.—Relaxation at the Mexican Room, Sherman Hotel.
- 7:30 to 9:00 p.m.—Banquet: Address by Dwight Murray, M.D., president-elect, American Medical Association. Presentation of awards.

Tuesday, June 5, 1956

Civic Arena, Aberdeen, South Dakota

- 9:00 to 9:30 a.m.—Film: "Toxemia of Pregnancy" (courtesy of Irwin, Neisler and Co.).
- 9:30 to 10:00 a.m.—"The Management of Cephalopelvic Disproportion," William F. Mengert, M.D., University of Illinois.
- 10:00 to 10:30 a.m.—"Dermatologic Use of Steroids," Francis W. Lynch, M.D., University of Minnesota.
- 10:30 to 11:00 a.m.—Recess to view exhibits.
- 11:00 to 11:30 a.m.—"Tuberculosis and the Physician in General Practice," J. A. Myers, M.D., University of Minnesota (courtesy of South Dakota Tuberculosis and Health Association).
- 11:30 to 12:00 noon—"Management of Peptic Ulcer," Walter L. Palmer, M.D., University of Chicago.
- 12:00 to 1:45 p.m.—Noon luncheons (GP, Medical and Ob-Gyn, North Dakota Diabetes Association).
- 2:00 to 2:30 p.m.—"Diabetes Mellitus with a Discussion of the Newer Types of Insulin," E. H. Rynearson, M.D., Mayo Clinic.
- 2:30 to 3:00 p.m.—"Surgical Treatment of Hydronephrosis," Frederic E. B. Foley, M.D., University of Minnesota.
- 3:00 to 3:30 p.m.—Recess to view exhibits.
- 3:30 to 4:00 p.m.—"Foot Problems Amenable to Surgical Treatment," Mark Coventry, M.D., Mayo Clinic.
- 4:00 to 4:30 p.m.—"Evaluation of Newer Surgical Techniques for Congenital Malformations of the Heart," Paul Adams, M.D., University of Minnesota.
- 4:30 to 5:00 p.m.—"The Respirator Center and Rehabilitation," William A. Spencer, M.D., Jefferson Davis Hospital, Houston, Texas (courtesy National Foundation for Infantile Paralysis).
- 8:00 p.m.—Mixer for doctors and their wives, Aberdeen Country Club.

June 6, 1956

Civic Arena, Aberdeen, South Dakota

- 9:00 to 9:30 a.m.—Film: "The Foley Y-Plasty."
- 9:30 to 10:00 a.m.—"Precancerous Lesions of the Colon and Rectum," Walter A. Fansler, M.D., and C. A. Neumeister, M.D., University of Minnesota.
- 10:00 to 10:30 a.m.—"Postoperative Psychoses," E. M. Hammes, Jr., M.D., St. Paul.
- 10:30 to 11:00 a.m.—Recess to view exhibits.
- 11:00 to 11:30 a.m.—"Diagnostic Aspects of Surgically Correctable Malformations of the Heart in Infants," Paul Adams, M.D., University of Minnesota.
- 11:30 to 12:00 noon—"Pituitary," E. H. Rynearson, M.D., Mayo Clinic.

BANQUET

Monday, June 4, 1956

Civic Arena, Aberdeen, South Dakota

Mr. Foster, executive secretary of the South Dakota State Medical Association, acted as toastmaster at the banquet. He introduced Dr. D. J. Halliday, president of

the North Dakota State Medical Association, who spoke as follows:

PRESIDENTIAL ADDRESS

"Mr. Toastmaster, distinguished guests, ladies and gentlemen:

"It is indeed a great honor for me to express on behalf of the North Dakota State Medical Association the sincerest good wishes of our society to our sister society of South Dakota, which is, on this occasion, celebrating its Diamond Jubilee.

"The sudden passing of our esteemed brother, Dr. F. Daniels Gillis, comes as a deep shock to all of us. While death is not unfamiliar to those who serve in our profession, we are never somehow reconciled to it. Our hearts go out to the members of the family in their bereavement. May they be comforted in their sorrow and in the knowledge that their beloved husband and father gave himself to the uttermost in the service of others.

"Mr. Foster, you and Dr. Mayer and the late Dr. Gillis, with the aid of your several committees have done a terrific job in arranging such a memorable program. The social side as well as the scientific part is really worthy of a celebration such as this.

"At this time, it might be well to recall that the first governor of Dakota territory was a doctor. He was Dr. William Jayne, a practicing physician from Springfield, Illinois—appointed by President Abraham Lincoln in May 1861.

"In the few minutes at my disposal, I should like to make only a few brief remarks which I believe might be pertinent to our profession. Just recently we gave a sigh of relief when the Senate Finance Committee removed from the amendment to the Social Security Act the disability benefits as contained in H.R. 7225. This feature was strongly opposed by the American Medical Association and by the several state societies by either appearing at the hearings or by letters and telegrams to Mr. Harry Byrd, Mr. Sherman Adams, and the senators from the several states. I am sure it was these strong protests from not only the doctors but the members of the Auxiliary that brought about the change of heart on the part of our government.

"There are 3 bills pending in the present session of Congress which should be of vital interest to doctors. These bills are designed to give the self-employed, including physicians, something approaching equal treatment with those employed under the federal tax laws.

"The Jenkins bill is H.R. 9; the Keogh bill is H.R. 10; and the Ray bill is H.R. 2092. The first 2 are identical, but the purpose of all 3 is similar. Since 1942, the Internal Revenue Code has permitted the establishment of pension plans by employers for the benefit of retired employees, as long as such plans met fair and reasonable standards. The contributions by an employer to such pensions are deductible as expenses. The amounts credited to the employees for whom the benefit is established are not taxable as income until the employee actually starts receiving such pension or retirement benefits. This has been a very important way of supplementing compensation and setting aside income during peak earning years to be available in years of retirement. No similar provision was made for the self-employed who number more than ten million. This of course includes the overwhelming proportion of professional men and women. If you or I wish to establish a retirement program today, we have to take it out of our net income after income taxes. Moreover, we cannot deduct it as an expense of practicing our profession. This is an obvious discrimination against the self-employed which can be corrected

only by legislation. The 3 bills are designed to achieve that correction. Physicians, in common with other self-employed persons, should press for the passage of these bills.

"One more thing I must mention is the problem of better public relations. Public relations committees have been set up on both the national and state level, but this is not enough. Do not expect these committees to resolve the poor publicity we get. Every doctor in every county society should be an ambassador of better physician-public relations in his own community, for no one is better qualified to give that help and guidance than the man who has dedicated himself to the service of mankind.

"I want to thank the doctors of North Dakota for the confidence and trust they have placed in me as their president this past year. It has been a privilege to have served such an honored profession."

Dr. D. J. Halliday awarded the honorary membership certificate and "50 Year Club Pin" to Dr. A. R. Sorenson, of Minot, North Dakota.

Dr. D. J. Halliday: "In our very humble way we pay our respect and honor to a very select group of 6 practitioners. Fifty years ago these gentlemen came to the great spaces of North Dakota dedicated to the healing of the sick. Their feet trod the pioneer trail. There were no hospitals, no nurses, no roads, and no telephones. Their work was hard but they held fast to their course and have made the practice of medicine more inviting. Shall we not say, 'Well done, good and faithful servants.'

"Dr. A. R. Sorenson, past president of the state medical association, life member of the American College of Surgeons, and a very valued member of our state association, this is your 50 Year Pin, and your honorary certificate signifying that you are an honorary member of the North Dakota State Medical Association. Congratulations, Dr. Sorenson.

"The following doctors could not attend, but we will send the certificates and pins by mail. Dr. A. D. McCannel of Minot receives both an honorary certificate and a 50 Year Pin; Dr. Frances Margaret Peake, still practicing at 204 Widlund Building, Grand Forks, graduated in 1906 from Wisconsin College of Physicians and Surgeons, Milwaukee, Wis., receives both the honorary certificate and 50 Year Pin; Dr. Frederick L. Wicks, Valley City, graduated in 1906 from Keokuk Medical College, Keokuk, Iowa, receives an honorary certificate and 50 Year Pin; Dr. Philip G. Arzt, Jamestown, graduated in 1905 from the University of Minnesota Medical School, Minneapolis, receives his honorary membership certificate and he became a member of the 50 Year Club in 1955; Dr. L. H. Kermott, Sr., Minot, graduated in 1904 from the University of Minnesota Medical School, receives his honorary membership certificate and received his 50 Year Club Pin in 1954."

Dr. L. W. Larson, Bismarck, and trustee of the American Medical Association introduced Dr. Dwight H. Murray, president-elect of the American Medical Association.

DR. MURRAY'S ADDRESS

"The Dakotas have a remarkable medical history—this I learned from reading Dr. R. G. Mayer's history of Dakota medicine.

"You can go all the way back to 1805 when President Thomas Jefferson sponsored the expedition of Lewis and Clark and directed them to take along medical supplies for the protection of the health of the party. Before leaving from St. Louis, Captain Clark was given a 'free

hand' course in medicine and surgery, and he served as the doctor of the expedition.

"It was fifty-five years later, in 1861, that your territory of Dakota attained corporate existence. For your first governor, President Abraham Lincoln chose Dr. William Jayne, a practicing physician of Springfield, Illinois. Your medical associations, therefore, can be proud that the territory had a regular physician as its first governor.

"And seven years before the territory was divided and North and South Dakota became states, the Dakota Medical Society was formed—June 3, 1882, seventy-five years ago in Millbank. The formation of the Dakota society was stimulated by the fact that the American Medical Association was scheduled to hold its annual meeting in St. Paul in June of that same year.

"Your Dakota society had 10 charter members. The temporary chairman was Dr. A. Grant of Bath, South Dakota, and the temporary secretary was Dr. W. E. Dunnean of Ellendale, North Dakota. At the meeting, Dr. S. B. McGlumphy of Yankton, South Dakota, was elected your first president, and he also gave the first known presentation of a paper at a medical meeting in the Dakotas.

"When the territory was divided into states in 1889, North Dakota formed its own medical association. However, together you celebrated fifty years of Dakota medicine in 1931, and now you are holding this joint medical association meeting in honor of the seventy-fifth year of Dakota medicine.

"As president-elect of the American Medical Association, I wish to pay the highest tribute to Dakota medicine and to the fine contributions you have made in the last seventy-five years. Your roll of great names in medicine is a long one, and you presently are contributing more new names to that list.

"I am proud to say that 2 important committees making reports to the American Medical Association in the next twelve months or so are headed by Dakota doctors.

"Next week in Chicago, Dr. Willard Wright of North Dakota and his committee of the Council on Medical Service will report to the A.M.A. House of Delegates on private practice by full-time faculty members of medical schools. Dr. Wright and his committee will set forth some fundamental principles on medical school-physician relations.

"And within the next twelve months or so, Dr. Leonard W. Larson of North Dakota and his 15 member Commission on Medical Care Plans will report on whether various types of medical care plans are being used to their greatest degree in promoting the availability of health services, and if these plans are being conducted to protect the public and the proper interests of the medical profession.

"The commission has a mammoth job. It is studying 250 to 300 miscellaneous medical care plans; scores of student health services by colleges and universities; 116 medical society and related plans including Blue Shield; about 500 private insurance plans; and many industrial programs that provide occupational and nonoccupational medical care, as well as the medical care coverage of 39 million employees under workmen's compensation.

"The findings of the Larson committee undoubtedly will help to guide the A.M.A. and its members in continuing the never-ending search for improving the quality and quantity of medical care for the American people.

"Because I am a general practitioner, because I started my private practice thirty-five years ago, and because I come from a small town in California, I feel that I am

quite close to your important program of doctor placement and distribution. Like many of you, I began in a small community where adequate medical facilities had to be built.

"In those 'horse and buggy' days it was difficult to practice the best medicine because of inadequate equipment, hospitals, and nursing care. Travel was slow and sometimes a trip out into the country could consume a half day. In addition, it was often necessary to make daily calls on a pneumonia case for as long as six weeks.

"Today many sicknesses can be cleared up quickly with the administration of wonder drugs, and rapid transportation allows the doctor to get to and from patients quickly and easily. Modern communication also permits the doctor to be in contact with patients whenever necessary.

"Finally, more patients are coming to the doctor's office to avail themselves of modern medical equipment, and more hospitals are available to sick people everywhere in the country.

"We all have heard a lot of talk about the so-called 'doctor shortage' but, is there really a shortage? Dr. Frank J. Dickinson, director of the Bureau of Medical Economic Research of the American Medical Association, says there is none. As he explains it, one-sixth of the land of the United States lies outside a 25-mile radius of the nearest physician, but only 0.16 per cent ($\frac{1}{6}$ of 1 per cent) of the population resides beyond this 25-mile radius.

"Today the doctor's use of the newest in medical science and in modern equipment, plus wonder drugs and fast transportation and communication, steps up his output of medical care and more than offsets what may appear to be a physician shortage based on geography.

"It is a fact, of course, that some communities do not have doctors, but often this is a matter of scanty population. Just as these communities do not have doctors, they also do not have lawyers, bakers, jewelers, or dentists. But as Dr. Dickinson's data shows, most people are not too far away from a doctor's office.

"In the Dakota's you have done great work in attracting doctors to small communities where there is a need for medical service. You have done this by awakening the populace to the fact that their towns must be attractive to the young physician. In many cases, your communities then have established good facilities where the doctor can do his best work and where patients can receive the best care and treatment. Working together, I am sure you can fill any other areas that are in need of a physician.

"As you well know, North and South Dakota rank in the top 6 states for the highest expectation of life at birth. This indicates to me that the people of the Dakotas not only are healthy individuals, but also that the quality of medical care here is on the same high level as anywhere else in the United States—and United States medical care is the finest in the world.

"I do believe, however, that medical care could be extended greatly and immediately, if more patients would seek or receive the medical care which is available to them. Despite the public's great appetite for medical and health information, its willingness to take advantage of medicine's progress still lags.

"I realize that it must be an old line to the public to hear us urging people to consult a doctor promptly when certain symptoms and conditions worry them. But some startling evidence has been turned up in a study conducted by the National Opinion Research Center, in cooperation with the Commission for Chronic Illness in

Hunterdon County, New Jersey. The study shows a vast amount of undiagnosed and unattended illness.

"Each person interviewed was asked to report the presence of any symptoms and chronic conditions to the interviewer. Later, clinical examinations were given and the results compared with reports made by the individuals. Of the confirmed pathologic conditions found in the clinical tests, only 22 per cent had been reported by the person interviewed; 61 per cent of all the heart conditions found had not been reported; 69 per cent of the diseases of the digestive system had not been reported.

"Another survey by the Health Information Foundation also shows that too many persons fail to obtain the medical care recommended by a physician or thought necessary by another member of the family. Thus, there have been 2 important findings: (1) A great amount of illness is never brought to the attention of doctors; and (2) treatment is not being sought for a large amount of recognized illnesses.

"Years ago the lack of hospitals or doctors may have been cited as a reason for this situation, but today it is more often the patient's own negligence, fear, or the feeling that a symptom or condition is unimportant and the doctor should not be bothered.

"To our patients, I would say that all of us would like to check symptoms and conditions before they become pressing or before it is too late. Early diagnosis and early treatment certainly are easier for both doctor and patient. Too many people are not taking full advantage of the benefits of modern medicine, and the cost is not the major reason.

"Unfortunately, there are a few persons who still believe that government can take care of health problems better than private medicine. The experience of business, industry, and agriculture, however, has proved that government operation, subsidy, or interference is of no great help. It may act as an immediate pain-killer in some instances, but it seldom cures or saves the patient.

"Medical care in the nation today is in good hands because of the doctor's burning desire to serve mankind, which is a natural expression of our profession. It is in good hands because there are no governmental strings attached to medicine. I ask you then, why should it be the function of government to establish a system that discourages us from our traditional service to mankind?

"Some critics also have charged that medicine's purpose is merely to preserve the status quo of health in the United States. Of course, we have to maintain what we already have, but medicine's aim is also to extend the bounds of life farther and farther, to help every individual improve his health, and to serve our fellow citizens every day of the year.

"Your A.M.A. will continue to support federal legislation on health and medical problems and other issues that are in keeping with sound economic and social progress and in keeping with the preservation of a free government in which the emphasis is on individual efforts and enterprise.

"I want to make it clear, however, that I do not think medicine is a group apart from everyone else in this country. Our interest in legislation is somewhat specialized, of course, but we are not seeking private favors. We support or oppose legislation because of our interests in the best possible medical care for the people and because of our intense desire to see freedom survive.

"We do not believe that good health can be purchased from the government or administered by it. When a third party-like government is added to the private relationship of doctor and patient, there is sure to be too little medicine and too much meddling.

"We have fought for medicine's freedom before; we are ready and determined to do so again if the need arises. Remember—no country ever becomes socialized until the medical profession is socialized. Therefore, we oppose government in medicine not only to protect freedom in our profession but also to protect all Americans from a form of government that lessens individual liberties.

"Keeping our democracy in a healthful political state is a never-ending task. It is not enough that our profession, or any other group of Americans, rises up only when there is a direct threat to democracy. The job requires the interest of all citizens at all times. And certainly the physician must contribute his share; he must donate substantial time to the job even though he is extremely busy. If we desire to work in freedom, we must not fail to work for the form of government that makes it possible.

"This year all of us can make a direct, personal contribution to democracy, for 1956 is a general election year. We have the great responsibility of electing a president, vice-president, a third of our United States senators, and all of our United States representatives. On top of this, state and local officers must be chosen.

"Therefore, I call upon each one of you to exercise your right of franchise. As a nation our record for participating in elections is far below what it should be. This record must not grow worse; instead, it must improve so that we all can keep our freedom. So *Vote*, regardless of how you vote.

"Of course, each of us must know the candidates and their views. The records and the 'promises' of the candidates must be evaluated so that we may help to choose top quality legislators. Now is the time to make our views known to the candidates. We cannot wait for them to come to us, for they are not going to be concerned about the problems of the medical profession unless we ourselves are concerned. The men we elect to Congress this year will be the men who introduce legislation in the first session of the eighty-fifth Congress. These men should hear our story; they should hear it from us now.

"In conclusion, let me congratulate you again on behalf of the American Medical Association, the House of Delegates, the Board of Trustees, Dr. Hess, and myself for seventy-five wonderful years of Dakota medicine. We salute you."

North Dakota State Medical Association Roster—1956

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 Tudor, Robert B. Quain & Ramstad Clinic, Bismarck
 Vinje, Edmund G. Hazen Clinic, Hazen
 Vinje, Ralph 206 9th St., Bismarck
 Vonnegut, Felix Linton
 Waldschmidt, R. H. Quain & Ramstad Clinic, Bismarck
 Walter, Eric W. Quain & Ramstad Clinic, Bismarck
 Weyrens, Peter J. Hebron
 Wittchow, A. W. Quain & Ramstad Clinic, Bismarck
 Zukowsky, Anthony Ozone Bldg., Steele

SOUTHWESTERN

Buckingham, William Elgin
 Bush, Clarence Beach
 Curiskis, A. A. New England
 Dukart, C. R. Dickinson Clinic, Dickinson
 Dukart, R. J. Dickinson Clinic, Dickinson
 Foster, Keith G. 109 W. 7th St., Dickinson
 Gilliland, R. F. Dickinson Clinic, Dickinson
 Gilsdorf, A. R. Dickinson Clinic, Dickinson
 Goulding, Robert L. Bowman
 Guloien, Hans E. Dickinson Clinic, Dickinson
 Gumper, A. J. 109 W. 7th St., Dickinson
 Hanewald, Walter C. Richardton
 Hankins, Robert E. Mott
 Hill, S. W. Regent
 Hiltz, Joseph A. Hettinger
 Larsen, Harlan C. 109 W. 7th St., Dickinson
 Maercklein, Otto C. Mott
 Martens, Apollon Bowman
 Martin, Gladys E. Dickinson Clinic, Dickinson
 Moses, James J. Richardton
 Murray, Kenneth M. Scranton
 Raasch, Richard F. Dickinson Clinic, Dickinson
 Reichert, D. J. Reichert Bldg., Dickinson
 Reichert, H. L. Reichert Bldg., Dickinson
 Rodgers, R. W. R. 109 W. 7th St., Dickinson
 Schumacher, W. A. Hettinger
 Smith, Oscar M. Dickinson
 Spear, Albert E. 610 1st Ave. W., Dickinson
 Tosky, Julian Hebron

STUTSMAN

Arzt, P. G. (honorary) 401 3rd St. S.E., Jamestown
 Beall, John A. Medical Arts Clinic, Jamestown
 Cameron, Donald M. Kulm
 Craychee, Walter A. 205 Union Ave., Oakes
 Daggs, Earl W. Ellendale Clinic, Ellendale
 Elsworth, John N. DePuy-Sorkness Clinic, Jamestown
 Fandrich, H. A. Medina
 Fergusson, Victor D. Edgeley
 Freeman, John G. State Hospital, Jamestown
 Gronewald, Tula W. State Hospital, Jamestown
 Hayward, M. Alan Gackle
 Hewitt, John M. DePuy-Sorkness Clinic, Jamestown
 Hieb, Edwin DePuy-Sorkness Clinic, Jamestown
 Hogan, Clifford W. DePuy-Sorkness Clinic, Jamestown
 Jansonius, J. W. Medical Arts Clinic, Jamestown
 Larson, E. J. DePuy-Sorkness Clinic, Jamestown
 Luey, Robert E. DePuy-Sorkness Clinic, Jamestown
 Lynde, Roy (honorary) Ellendale
 McFadden, R. L. DePuy-Sorkness Clinic, Jamestown
 Martin, Clarence S. Kensal
 Melzer, Simon W. Woodworth
 Nierling, Richard D. DePuy-Sorkness Clinic, Jamestown
 Oster, Ellis Ellendale Clinic, Ellendale

Pederson, T. E. DePuy-Sorkness Clinic, Jamestown
 Saxvik, R. O. State Hospital, Jamestown
 Sorkness, Joseph DePuy-Sorkness Clinic, Jamestown
 Swenson, John A. DePuy-Sorkness Clinic, Jamestown
 Tripp, Harry D. State Hospital, Jamestown
 Turner, N. W. LaMoure
 Van der Linde, John M. Medical Arts Clinic, Jamestown
 Van Houten, R. W. 301 Union Ave., Oakes
 Woodward, R. S. DePuy-Sorkness Clinic, Jamestown
 Young, John H. State Hospital, Jamestown

TRAILL-STEELE

Dekker, O. D. U. of Minn., Minneapolis
 Kjelland, A. A. Hatton
 LaFleur, H. A. Mayville
 Little, James M. Mayville
 McLean, Robert W. Hillsboro
 Mergens, Daniel N. Hillsboro
 Pearson, L. O. Mayville
 Rosenberg, Mervin Hatton
 Vandergon, Keith G. Portland
 Vinje, Syver Hillsboro
 Waydeman, H. B. Hunter

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TENTH ANNUAL MEETING

WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

Aberdeen, South Dakota, June 2, 3, 4, 5, and 6, 1956

The tenth annual meeting of the Woman's Auxiliary to the North Dakota State Medical Association was held in Room "A", Alonzo Ward Hotel, Monday, June 4, 1956, 9:00 A.M. The meeting was formally opened by Mrs. J. H. Mahoney, president.

The pledge of loyalty was given by Mrs. J. D. Cardy, and repeated in unison by the members present.

Mrs. V. J. Fischer gave the invocation, a prayer by Dr. Peter Marshall.

Mrs. Mahoney introduced our honored guest, Mrs. M. G. Lawson, Little Rock, Arkansas, national president.

Door prizes were then presented.

The roll was called by the recording secretary, Mrs. J. W. Jansonius, and the following were present: Mrs. J. H. Mahoney, president; Mrs. C. A. Arneson, president-elect; Mrs. J. D. Cardy, first vice-president; Mrs. V. J. Fischer, second vice-president; Mrs. J. W. Jansonius, recording secretary; and Mrs. A. C. Kohlmeyer, treasurer.

State chairmen: Mrs. D. J. Halliday, historian; Mrs. Clyde Smith, legislation; Mrs. S. C. Bacheller, nominating; Mrs. M. M. Heffron, press and publicity; and Mrs. C. J. Baumgartner, student loan fund.

District presidents: Mrs. R. McLean, Hillsboro.

Councillors: Mrs. O. M. DeMouilly, Flasher; Mrs. R. W. Rodgers, Dickinson; and Mrs. E. T. Keller, Rugby.

Delegates: Mrs. E. A. Haunz, Grand Forks; Mrs. John Cartwright, Bismarck; Mrs. L. H. Reichert, Dickinson; Mrs. O. A. Sedlak, Fargo; Mrs. R. D. Nierling, Jamestown; Mrs. A. R. Sorenson, Minot; and Mrs. A. N. Flaten, Edinburg.

A motion was made by Mrs. Clyde Smith that the minutes of the ninth annual meeting be accepted as printed in THE JOURNAL-LANCET.

Mrs. A. C. Kohlmeyer then read the Treasurer's Report.

Financial Report, 1955-1956

Receipts:

Balance on hand, August 18, 1955.	\$1,207.03	
Dues:		
311 members at \$4.00	1,244.00	
1 honorary member		
312 members		
Sophomore student loan contributions	2,514.30	
State Medical Association convention contributions	253.67	
Registration fee, Aberdeen (37 at \$1.00)	37.00	
Sale of handbooks (20 at 50 cents)	10.00	
Total Receipts	\$5,266.00	

Disbursements:

Dues to national	\$ 312.00	
U.N.D. sophomore student loan fund	2,514.30	
President's expenses:		
National convention	\$250.00	
Chicago conference	100.00	
Discretionary fund	50.00	
Miscellaneous	15.00	
	415.00	415.00
President-elect's expenses:		
Chicago conference	100.00	
Postage, etc.	4.04	
	104.04	104.04
Newsletter and stationary—3 issues		203.62
Standing and special committees:		
Press and publicity	2.06	
Public relations	2.25	
Treasurer, postage	3.50	
Legislation committee	3.40	
	11.21	11.21

Miscellaneous:

President's pin	50.00	
Handbooks—50	25.00	
Mimeographing constitutions	5.00	
Membership record cards	10.92	
Memorial for Mrs. Baillie	25.00	
Memorial for Dr. Gillis	25.00	
Ledger for Treasurer	1.53	
	142.45	142.45
Convention Expenses:		
Gift for Mrs. Jansonius	20.16	
Gift for Mrs. Lawson	20.00	
Luncheon	146.75	
	186.91	186.91

Total Disbursements \$3,889.53

Mrs. C. A. Arneson introduced Mrs. J. H. Mahoney, state president. Mrs. Mahoney presented the following president's report:

President's Report, 1955-1956

Although our North Dakota auxiliary is young in years, it is long on accomplishment. Because of our scattered population, it is difficult to carry on some of the larger projects suggested by National. However, we feel that by our members' active participation in many other related organizations and projects, we are furthering and attaining the goals of our organization. Each year we progress and find more activity in each field of endeavor, which is, after all, the way we grow.

Last year was the first year our state had contributed toward A.M.E.F., and \$41 was given. This year the amount was raised to \$138, entirely by the use of memorial cards.

We keep plugging *Today's Health*, and again I am proud to report that my own Devils Lake District is listed in the Exclusive Club, having sold over 150 per cent of our quota.

In *Bulletin* sales, Northwest District, which includes the *Bulletin* subscription in its dues, again has 100 per cent.

We have cooperated insofar as possible with the state medical association. Last year, for the first time, our state president was asked to report to the House of Delegates, and we hope that this practice will be continued. When I made my report to the House of Delegates this year, I expressed to them our willingness to cooperate and work with them on their projects—after all, I brought out, our auxiliary is not an independent organization—only a helping arm of theirs. One method I suggested was having our district presidents confer with the doctor appointed as our special advisor in order to plan our projects together. The suggestion was also made that the wives' dues be included with the doctors'. States that have adopted this practice seem to have the most enthusiastic auxiliaries.

At our annual fall board meeting, we conducted a school of instruction for district presidents and state committee chairmen for the first time, which was very well received. We plan to expand and enlarge our President's Handbook inaugurated last year.

We feel that most of our public relations are carried on individually, as each of our members has been very active in some phase of community affairs, and in this way is directing community thinking in the proper channels as regards health, education, and relationships. Our members are officers and leaders in P.T.A., girl scouts,

boy scouts, State Society for Crippled Children, American Legion Auxiliary; one member was recently elected to her city park board. Others participate in hospital auxiliaries, drives for Red Cross, cancer society, National Foundation for Infantile Paralysis, Community Chest, Easter seal campaign, immunization clinics, etc. One auxiliary has established a walking blood bank. Another sells handicraft made by the patients at our TB sanatorium; another donates two Christmas baskets to needy families.

Our component auxiliaries have been kept well informed on pertinent federal and state legislation. Many letters and telegrams have been sent our congressmen urging their opposition to the disability section of H.R. 7225. With Mrs. S. C. Bacheller, national sub-chairman of legislation, our state chairman presented a panel on legislation at our joint convention with South Dakota in June.

Our largest project this year, as it has been since its origin in 1951, has been our sophomore medical student loan fund. This year \$2,514.30 was raised, bringing our total to \$10,430.54. Up until this year, 15 students were granted loans of approximately \$500 each. Money was raised by dessert bridges and fashion shows, bake sales, and dinner dances for doctors and their wives, which all felt helped to promote better relations among doctors' families, as well as to make money. We received a very complimentary letter from Dean Harwood, of the University School of Medicine, expressing his appreciation for our work on this project.

We are very proud of our *News Letter*. This year it has been expanded and made most interesting by the use of personality sketches of our officers, articles by committee chairmen, and news of our various members. We started a new practice of sending the *News Letter* to all doctors' wives in the state in the hope of stimulating nonmembers into becoming members of the auxiliary.

Membership this year rose to 312, an increase of 17 over last year.

Last year our records were placed in the state medical executive secretary's office in Bismarck in order to have a permanent, convenient place to keep them.

Nurse recruitment has been one of our auxiliary's strongest endeavors. One district has an enthusiastic future nurses' club now in its second year. Another district gave a Christmas tea for high school girls and discussed nursing as a career. Another drove nurse recruitment teams from local hospitals to neighboring small towns. One district contributed \$50 to a new nursing home and another contributed \$75 for a practical nurses' scholarship.

In the field of mental health, we have tried to make our members recognize its importance so that they might acquaint others with the needs in our area. Monthly birthday parties were given for the patients at the State Hospital. Magazines have been sent to both the State Mental Hospital and the State School for Mentally Retarded Children. At the joint convention of North and South Dakota, a psychiatrist spoke on mental health.

Many of our members have been most active in the ground observer corps in cities where there are civil defense filter centers.

One auxiliary provided 5 baby-sitters' packets to the girl scouts to be used in their intermediate training program.

Our constitution and bylaws have been revised and brought up-to-date by an efficient revisions committee.

As state president, I attended the national convention in Atlantic City last June; the fall conference for presi-

dents and presidents-elect in Chicago, where I was a member of the mental health panel; the medical-press conference in Minot; and made a preconvention visit to Aberdeen to help plan this convention. I have been graciously and hospitably entertained by 5 districts in Jamestown, Grand Forks, Minot, Fargo, and Devils Lake. In addition, I have written innumerable letters, received reams of mail, and talked wherever possible, stressing the value of the auxiliary and its activities.

After serving in some capacity in the state organization since its instigation, I still feel the same way about the auxiliary. The thing that I enjoy most about it is the marvelous contacts one makes, both in the state and nationally. After all, in what other organization can you meet women with whom you have more in common?—while at the same time be of service to your husband and his profession?

I'd like especially to thank my wonderful officers and state chairmen and district presidents. Without their marvelous cooperation and enthusiasm, we could not have gone as far. I couldn't properly finish this report without giving credit to a most understanding and helpful family who have cheerfully put up with no mommy at times—or dinner out of a can more than once—when mommy spent the afternoon at the typewriter.

It has been a year I shall never forget, and I thank you all so much for giving me the privilege of serving as your state president.

MRS. J. H. MAHONEY, President

The following reports were given by the other officers, state chairmen, and auxiliary presidents:

Organization Report, 1955-1956

Membership in the Woman's Auxiliary has increased from 295 last year to 312 members this year. This represents only an increase of 17 members over last year, but indicates a healthy and continued growth and interest in the auxiliary. During our nine years of existence, we have almost doubled our members, growing from 163 during our first year of organization to our present total of 312.

No district had a large increase of members, but each district managed to maintain its past membership or slightly increase its numbers. The following 10 districts by membership are: Devils Lake District, 19; First District, 61; Grand Forks District, 60; Kotana District, 18; Northwest District, 30; Sheyenne Valley District, 10; Sixth District, 57; Stutsman District, 23; Traill-Steele District, 12; and Southwestern District, 22. We have 1 honorary member, Mrs. Mason G. Lawson, who is now president of the national auxiliary.

I wish to express my appreciation to each district president and organization chairman for increasing and maintaining their auxiliary membership.

MRS. CHARLES A. ARNESON, chairman

Public Relations Report, 1955-1956

Just recently it was said to me that the medical profession definitely needed to do something about public relations. When I hopefully asked for suggestions, none were offered—just, "I don't know, but they should do something."

In reviewing the final reports from the North Dakota districts, collectively and individually the medical auxiliary members of our state have been "doing something"—in fact a great many things.

Again this year the main project for all districts has been the fund raising program for the sophomore medical student loan fund now in its seventh year. The new

American Medical Education Foundation project received support from several districts and will undoubtedly gain more impetus as time goes on. Many subscriptions to *Today's Health* have been sold.

Interest in nurse recruitment programs and future nurses clubs is being shown by several districts as well as work in rural health and a survey of health facilities. One district considers its "Walking Blood Bank" program its most successful project and stresses the value of such a program in time of disaster or emergency.

Our women have been active in a host of worthwhile community projects. High on the list are civil defense, Red Cross, cancer society, polio drives, mental health, heart fund, tuberculosis and crippled children's work, social service and rehabilitation committees for various organizations, and work in hospital auxiliaries and as hospital volunteers. Many have worked diligently in P.T.A., as volunteer election workers, cub and girl scout leaders, and church work—the list is almost endless. One group for several years has sponsored and handled the sale of handicraft for the patients at San Haven while another has a "Christmas basket" project complete with food, clothing, and toys to give to deserving families.

Interest in current legislation has been shown in several districts, and letters to our legislators expressing our views have been sent.

With the continued interest and participation in civic and community activities and the promotion of the objects of the auxiliary, it can truly be said that we are "doing something" about public relations.

MRS. V. J. FISCHER, chairman

Legislative Report

The National Legislation Committee had this year asked auxiliary members to concentrate their attention on 3 legislative matters: federal reinsurance, Jenkins-Keogh bill, and the Bricker amendment. However, another bill of great importance was passed by the House of Representatives last session, and this session is being considered by the senate. The A.M.A. opposes this bill, H.R. 7225, most strenuously because of the disability payments proposal which would give cash payments to disabled workers at age 50.

A.M.A. witnesses who testified against the bill made 5 points:

1. An intensive objective study is needed because this is an entirely new type of benefit—a benefit arising from a physical mental ailment rather than from advanced years.

2. Medical reasons alone would make the program unmanageable. The medical problem of determination is very difficult and often impossible when neurologic and psychiatric factors are involved. Among marginal income workers is the danger that the security of monthly payments would rob the patient of the desire to become rehabilitated. To be branded as "totally and permanently disabled" certainly would have a disastrous emotional effect on an unknown number of patients.

3. The cost cannot be calculated. Medical insurance experience shows that no way is known to estimate the number of ill or handicapped persons who would qualify as totally and permanently disabled. Nor is there any way to estimate the loss to the labor market of handicapped persons now productively employed who could and would withdraw to the pension rolls if offered this security.

4. Pressure for expansion would become irresistible. The age limit would be dropped until the entire labor force would be eligible for pensions on the establishment of a disability.

5. Rehabilitation was urged, not pensions. Except in rare instances, federal, state, municipal, or private services are available to assist the handicapped. They offer a far better promise to the handicapped than the proposed program of pensions for those who can establish themselves as disabled.

The way in which this bill was opposed by the A.M.A. and its auxiliary was an interesting example of their efficiency. Mrs. Charles Goodhand, our national legislation chairman, had a telephone round-table conference with her sub-chairman to write senators in opposition to this bill. Mrs. Stephen Bacheller, who is sub-chairman for this region, got in touch with her state chairmen, and we chairmen alerted our district chairmen or presidents to pass along the word to their auxiliary members. The matter has not been voted upon as this is written, but it is likely we shall be able to report the result at our convention.

The Bricker amendment, limiting the internal effect of foreign treaties, and the Jenkins-Keogh bill, which would defer income tax payments on income set aside for retirement, are being supported by the A.M.A. We sincerely hope that our members have written their congressmen asking them to vote for these bills.

This year I have used the state *News Letter* as a means of spreading legislative information. As the *News Letter* is widely read by doctors' wives, it seemed an excellent medium. Our editor's cooperation was 100 per cent, and so far she has published an article which I wrote on our 3 first mentioned legislative interests and a reprint from *Medical Economics* which listed current medical legislation in easy to read style. The article which I wrote was presented in a rather light and personal fashion in hope it would catch a few eyes. From casual conversations, it seems to have been read by an adequate proportion of readers.

MRS. CLYDE SMITH, chairman

Program Report, 1955-1956

I have attempted to survey the programs held by the 10 district auxiliaries in North Dakota and to compare these with the programs of past years and with the national program. This analysis is necessarily incomplete but one thing is very clear. We have come a long way. Our districts are well organized and our membership increases each year.

Year by year there is a noticeable increase in the number of subscriptions to *Today's Health*. Two of our district auxiliaries have included the subscription in the annual dues, and 1 district is listed in *Today's Health* Exclusive Club which includes districts which make 150 per cent of their quota.

As our organization grows older and stronger the *Bulletin* becomes more popular. One district includes both the *Bulletin* and *Today's Health* in their annual dues.

In the field of nurse recruitment, we better our relationship with the nursing profession each year. Several districts have successfully organized future nurses clubs. Others obtained the films *Career in Nursing* and *Medical Technology* and have shown them to various groups of teenaged girls. The members of 1 district take the responsibility of driving nurse recruitment teams from the 3 local hospitals to high schools in outlying areas. This year 1 district chartered buses and escorted nursing students and their instructor to the Grafton State School for classwork. A survey is being made and a list prepared of loans and scholarships available to student nurses. This list is as yet not complete.

Since 1952, we have had a chairman of rural health appointed by our state society. Each year we have par-

ticipated and sent delegates to the joint meeting of the North Dakota State Public Health Association and the North Dakota State Rural Health Council. This year the joint meeting of the associations was not held, which has limited our effectiveness in this field.

Last year our state chairman of mental health made a survey and found that mental health is a major problem in North Dakota. Her report made our members familiar with the recommendations made by the American Psychiatric Association and the needs existing in our 2 institutions, the State Mental Hospital at Jamestown and the State School for the Mentally Retarded at Grafton. At the meetings of several of our component auxiliaries, talks by psychiatrists on various aspects of mental health have been featured. One district collected magazines and comic books for the patients at the school at Grafton and interest in that institution is steadily growing.

Our state press and publicity chairman has done an outstanding job this year. Through 4 lengthy *News Letters*, she has kept us informed of activities of other districts, pending legislation, and chatty news items. Our *News Letter* has strengthened our organization and shortened the many long miles that separate us. At the convention last May, a motion was made to send copies of the *News Letter* to the wives of all physicians in the state. It is hoped that this has served to arouse the interest of nonmembers.

At the convention in May last year, a report, submitted by our chairman of legislation, was so remarkable that it was acknowledged by a standing vote of thanks. This year our state president in her visits to county auxiliaries has emphasized the importance of watching federal and state legislation pertaining to matters of health. By way of illustration, she discussed the importance of bill H.R. 7225 and urged each auxiliary to write to our senators. It has been reported that this was done.

Members of our auxiliaries are vitally interested in handicapped children. For two years, 1 of our members served as county chairman for the North Dakota State Society for Crippled Children and Adults. This office has now been accepted by another member. During the time of the Easter Seal Campaign, members throughout the state participate in this activity. In 1 county, a cerebral palsy clinic is held annually, and our members there participate collectively, making this an auxiliary obligation. One district has donated funds to the Opportunity School for Handicapped Children, and another district has for many years sponsored a project and raised funds for San Haven, a tuberculosis sanatorium.

Our members are found to be very active in all community campaigns, such as the National Foundation for Infantile Paralysis, American Red Cross, and the American Cancer Society. The Cancer Caravan which tours our state is well supported by our members.

Where civil defense programs have been established, our members participate as, for example, in 1 county, members work each week in the Filter Center.

Last year for the first time a chairman was appointed for A.M.E.F. Several contributions were received and interest is growing. The dean of our school of medicine has presented talks on this subject to our members and other topics relating to medical schools. The more informed our members become the greater their support will be.

The sophomore medical student loan fund stands as the number one activity in our state program. Since its inception in 1951, our members have provided more than \$7,000 to be given as interest-free loans to needy med-

ical students. The chairman of this committee reported that the sum raised in 1955 doubled that of 1954. This money has been raised by a variety of activities, such as style show, teas, dinner parties, bake sales, and donations. We are proud of the fact that to date more than 14 students of the University of North Dakota School of Medicine have been encouraged to complete their education with our help. The fund is the revolving type, and we anticipate that in the near future loans will have been repaid to such an extent that the fund can maintain itself and our assistance will no longer be necessary.

The material and assistance received throughout the years from the program committee of national has been very useful in developing the programs in our auxiliaries. Next year we might well expand and further develop this year's theme of "Active Leadership in Community Health," since we have not as yet exploited this topic fully. Active participation in S-D Day Observance, care of the aged and chronically ill, school health, and Doctors' Day might well be given more consideration. We must also keep in mind the nationwide survey being made by the Woman's Auxiliary to the American Medical Association regarding charitable services and contributions of physicians, and it is hoped that during the coming year the auxiliaries of our state will take a more active part in furthering this survey.

Much of what is contained in this report will be found in the reports made by the district presidents and chairmen of various committees. However, this report is primarily designed for use by the regional program chairman and is expected to be interpreted with that in mind.

MRS. JAMES D. CARDY, chairman

Mrs. J. D. Cardy suggested that we start thinking about sponsoring an "Essays and Prize" program, winner to be awarded a scholarship. The matter was tabled.

Nurse Recruitment Report

This will be a very brief report, but I am pleased to tell you that 6 districts in our state stated that they are doing something in the interest of nursing careers. Some have shown films on health careers. Others have distributed literature and used this subject as program material for home and city organizations.

To date, there is but 1 future nurses club organized in North Dakota (Stutsman county) with a membership of 30. Two other districts expressed hope of organizing such clubs in the near future.

The National League for Nursing Headquarters in New York has distributed many pamphlets and books on medical careers to all high schools in the nation and to all state medical auxiliaries in the country. This has indeed helped our young people in choosing their careers.

There are hundreds of nursing scholarships available in our state. Almost each city or county has them to offer our young future nurses upon request. The state also has a state loan fund available to practical nurses, basic program nurses, and postgraduates. The only stipulation is to remain and work in North Dakota for two years after state board examinations.

Then too, there is the North Dakota State Nurses Memorial Fund available to a deserving person. This money is given outright and does not have to be repaid. Miss Gladys Wentland, executive secretary to the North Dakota State Nurses Association, Bismarck, receives application for this money.

As medical auxiliary members, we can do much to encourage our young people in our state to choose nursing as their career.

MRS. GEORGE VIGELAND, chairman

Press and Publicity Report, 1955-1956

As of April 1, 1956, 4 issues of the *News Letter* have already been published. It is planned to send out a fifth issue about May first.

The response to requests for news has been most gratifying. News from 7 or 9 of our 10 districts has appeared in each issue.

In accordance with a decision reached at our 1955 convention, the *News Letter* was sent this year not only to our auxiliary members but to all wives of physicians who are members of the N.D.S.M.A. It was also sent to widows of physicians and to wives of newly arrived physicians whose names were given to us by councillors or by the executive secretary's office of the N.D.S.M.A. In addition, we sent 49 copies of each issue out of the state to A.M.A. auxiliary headquarters and to editors of auxiliary publications in other states. The number of names on our mailing list, therefore, increased from 310, in April 1955, to 482, in April 1956.

Our mailing list, which has been thoroughly checked and revised, seems to be as accurate and comprehensive as is possible. All names and addresses have been checked this year with district councillors and local telephone directories. New names have been added and old ones dropped throughout the year. It is hoped that councillors and *News Letter* recipients will continue to keep the editor informed of necessary revisions and address changes.

Because of the increased postage expenditure necessitated by the increased mailing list, we have economized this year by sending the *News Letter* without an envelope as third class mail.

Birth, wedding, engagement, travel, and sympathy notices; district activities; and listing of individual members' contributions in public relations have been regular features of each issue. Messages from state officers or chairmen and column of news about newcomers have also appeared in each issue. The last 3 issues include a series of profiles of our state officers. Other miscellaneous timely news items about members of current auxiliary affairs were published as submitted or suggested.

Our *News Letter* is one of the few state auxiliary publications which are mimeographed rather than printed, because mimeographing service is donated to us by the N.D.S.M.A. executive secretary's office, thereby saving us printing labor costs. However, if our number of North Dakota physicians continues to increase and, consequently, our quantity of news, our *News Letter* may become so bulky that to continue mimeographing it will be impractical.

MRS. M. M. HEFFRON, chairman

Historian's Report

The Historian's Book is up to date. We are keeping some activities of the medical society in our records.

MRS. D. J. HALLIDAY, Chairman

Bulletin Report

As of April 6, 1956, North Dakota had 58 subscriptions to the *Bulletin*, the official magazine of the Woman's Auxiliary of the American Medical Association.

The Northwest District is again 100 per cent with 30 subscriptions and 30 members.

MRS. L. HENRY KERMOTT, chairman

Mental Health Report

The 1956 auxiliary did not call for a special mental health program.

All county auxiliaries report the various activities of their members, such as conducting local programs for

civic organizations on mental health with a psychiatrist as the speaker.

Magazines have been collected by local auxiliary members and sent to the North Dakota State Hospital and the Grafton State School for the Mentally Retarded Children.

The main program at our joint meeting with South Dakota will be on mental health with Dr. John Freeman, psychiatrist, as the speaker.

MRS. G. G. THORGRIMSEN, chairman

American Medical Education Foundation

It is a pleasure to be able to report an increase in the amount donated to the A.M.E.F. this past year. To date we have received \$138 which included \$75 from the First District Medical Auxiliary in memory of Mrs. W. F. Baillie, \$10 from the Stutsman District in memory of Dr. George Holt of Jamestown, \$10 from a member of the Grand Forks District in memory of Senator Carroll E. Day, and \$10 from 2 members of the same district in memory of Mrs. Miles Miller, \$25 from the Woman's Auxiliary in memory of Mrs. W. F. Baillie, \$5 from Mrs. Winnifred Porter and \$3 from Mrs. Irene Stratte in memory of Mr. Arnold Jensen.

The entire amount is to be used for the benefit of the University of North Dakota Medical School, which this year received a grant of \$11,092 from the national fund of the American Medical Education Foundation.

The Woman's Auxiliary to the American Medical Association raised a total of \$80,539.70 for the A.M.E.F. in the past year, and Mrs. Mason Lawson, our national auxiliary president, said that it is her hope that the auxiliaries throughout the nation will increase the A.M.E.F. auxiliary fund gift to \$100,000 in 1956.

It is hoped that the coming year will bring donations from all 10 districts in North Dakota.

MRS. W. E. G. LANCASTER, chairman

"Today's Health" Report

I wish to submit the following report on the 1955-1956 *Today's Health* subscription contest:

District	Number of Subscriptions	Quota
Devils Lake	27	17
Kotana	24	16
Northwest	34	26
Sheyenne	8	10
Grand Forks	40	61
Sixth	29	53
First	25	60
Stutsman	9	23
Traill-Steele	0	7
Southwest	0	21
Total	196	294

Percentage—66 2/3%

MRS. D. F. PILE, chairman

Civil Defense Report

Due to our rural population and distances involved, civilian defense has been rather difficult to instigate and foster during the past year. However, some definite progress has been made. Colonel Noel T. Thorlson, state director of civilian defense, has been very cooperative at my request, and all bulletins, announcements, and films coming from his office have been made available to all district chairmen of Civil Defense.

All of the material and publications that have been sent from the national headquarters also have been distributed to the district chairmen.

Out of the 10 auxiliary districts in the state, 7 have sent reports to me acknowledging receipt of the above material.

The largest response has been in the area of the

Ground Observer Corps, where nearly all districts report that their personnel are members of the Ground Observer Corps. As North Dakota is rapidly becoming one of the first rings of defense to enemy air attack, this appears to be one of the paramount objectives of the auxiliary.

Mrs. R. F. GILLILAND, chairman

Student Loan Fund Report

Districts

Northwest—November 1955, champagne brunch at the Clarence Parker (\$245.24). The remainder included in dues of each member	\$ 265.00
Sixth—A dinner dance at the Apple Creek Country Club. Each member of this district was asked to buy a \$10 ticket. Food was furnished by the auxiliary. Extra charges were made for cocktails, door prize, and a white elephant sale	700.00
Trall-Steele	24.00
Grand Forks—Bake sale October 1955 at the Red Owl store (\$236.00). Valentine supper party February 1956. The supper was held at the Riviera Club. Dr. Saiki sold tickets to faculty members of the medical school (\$589.00)	825.30
First—Bridge fashion show with dessert	290.00
Stutsman—Donations of \$5.00 from each auxiliary member	110.00
Sheyenne Valley—Lunch money and annual dues	15.00
Kotana—No report	
Southwestern—Donation from treasurer from dues	100.00
Devils Lake—Benefit bridge, \$70; \$8.00 contributions from members and balance from treasury	100.00
Williston	85.00

Total to date \$2,514.30

Adding this year's contribution to money raised since the project's beginning in 1951, we find we have raised \$10,345.54. As of September 1955, approximately \$1,000 had been repaid. So we see the fund we have set up becoming revolving. It's only by looking at our project as a whole that we can really appreciate what a service we are giving the University and the medical student. Thanks must be given to all the auxiliary members.

STELLA H. FRITZELL, chairman

Mrs. J. H. Mahoney read the following letter from Dean Harwood:

Mrs. A. C. Kohlmeier, Treasurer
Women's Auxiliary to the
North Dakota State Medical Association
Larimore, North Dakota
Dear Mrs. Kohlmeier:

It was with a great deal of pleasure this morning that I received from you a check for \$2,490.30 as the annual contribution of your society to the Sophomore Medical Student Loan Fund.

This contribution comes at a very opportune time since we have several applications for loans at hand at the present time which we have been holding until we received your check. I believe you realize this is the biggest contribution to date, and for your interest, I am listing them by years.

1951	\$1,047.76	1954	\$1,400.04
1952	1,225.67	1955	2,339.96
1953	1,121.85	1956	2,490.30

This brings us up to a total, of course, of \$9,625.58.

I do not know how the future is going to shape up. I think that at least for the next year or two we would appreciate it very much if you could continue your efforts to build up this loan fund for the following reason. Let us suppose a single student needs to borrow \$1,000 for his third year in medical school. That \$1,000 will be tied up for that third year, his fourth year, and his year of internship. If he goes into the service he may or may not be able to pay that back in the next two years, so that the \$1,000 might well be tied up for a total of five years. If, therefore, we assume that another student is

going to need the same amount of help in that next five years, we will need in our capital, \$5,000 to enable one student each year to borrow \$1,000 a year before repayments will make up the deficit. Therefore, the present sum from you good folks will support approximately two students at \$1,000 each, or four students at \$500 each, which, of course, is the present top limit of loans from this fund. I believe further that your Loan Fund is set up limiting the loan to students in the first year after transfer. There might be occasions when in the future it might be important for a student to be able to borrow an additional \$1,000 for his fourth year which would add to our needs. At any rate, since the need for loan funds seems to exceed the supply, I would feel it quite important to continue this drive for the coming year at least.

May I again express the sincere thanks of our North Dakota medical students, Dr. French and the Loan Committee, the entire medical school officially, and my own thanks personally for your check which I would suspect might be the largest single check you ever made out and signed.

Most sincerely,

T. H. HARWOOD, M.D., Dean

Receipts and Disbursements—Sophomore Student Loan Fund

Receipts:

7-2-51	Woman's Auxiliary	\$1,047.76
8-25-52	Woman's Auxiliary	1,225.67
7-7-53	Woman's Auxiliary	1,121.85
3-1-54	Southwest Medical Auxiliary	32.00
6-3-54	Woman's Auxiliary	1,373.00
6-8-55	Woman's Auxiliary	2,339.96
5-22-56	Woman's Auxiliary	2,490.30

\$9,630.54

Interest received on notes 81.47

\$9,712.01

Notes outstanding:

1.	Dated 7-1-55	\$500.00
2.	Dated 6-26-54	500.00
3.	Dated 7-20-55	500.00
4.	Dated 8-11-53	500.00
5.	Dated 7-19-55	500.00
6.	Dated 5-18-56	500.00
7.	Dated 5-13-55	500.00
8.	Dated 4-27-55	500.00
9.	Dated 8-22-53	500.00
10.	Dated 7-2-54	500.00
11.	Dated 1-12-53	343.19
12.	Dated 6-16-55	500.00
13.	Dated 12-26-52	242.18

\$6,085.37

Balance in fund \$3,626.64

Revisions Report

Under Article II, under Objects, Section 1 now reads, "To assist the American Medical Association in its program for the advancement of medicine and public health."

Under Article IV, Membership, Sections 2 and 3 were incorporated to read, "Members in good standing of the component auxiliaries are active members of this auxiliary. Wives of physicians who are members in good standing of local medical societies or widows of deceased physicians who were in good standing of local medical societies at the time of their death are eligible for active membership."

A new Section 3 was added to read: "Each district shall make its own decision about the status of its members, and each auxiliary member's status shall correspond to that of her husband's."

Under Article V, The Convention, Section 3, Subsection 4 was added: "Immediate Past State President"; also, Section 6 was added: "A registration fee of \$1.00 shall be collected from each registrant."

Under Article VI, General Officers under Section 1, after Councillors to be elected for a three year term, "these to be elected before convention," was added.

Under Chapter III, Duties of General Officers, Section 5, the following was added: "They shall be responsible for sending news to "Press and Publicity." This was in regard to councillors.

Under Chapter IV, "Standing Committees and Their Duties" was changed to "Committees and Their Duties."

Section 1—The standing committees now consist of the following: (1) Press and Publicity, (2) Historian, (3) Legislation, (4) Nominating, (5) Organization and Membership, (6) Parliamentary, (7) Program, (8) Public Relations, (9) Resolutions, (10) *Today's Health*, (11) A.M.E.F., (12) Revisions, (13) Finance (duty to prepare and budget), and (14) *Bulletin*.

The special committees consist of the following: (1) *Bulletin*, (2) Civil Defense, (3) Nurse Recruitment, (4) Rural Health, (5) Mental Health, and (6) Student Loan Fund Committee.

Section 4 was changed from *Hygeia* to *Today's Health*.

Section 7 was changed from The Editorial Committee to Press and Publicity.

Chapter V, under Dues, Section 1 has been revised from dues amounting to \$.25 to \$1.00.

Section 2 has been changed from \$1.00 to \$3.00.

Under Chapter VI, Component Auxiliaries, under Section 3, the Advisory Council is now "Board of Directors"; also, under Chapter VII, Sections 1 and 3.

All words "provided, however" have been changed to "except."

Mrs. G. H. HOLT

Mrs. J. W. JANSONIUS

Motion was made by Mrs. E. T. Keller that the Revisions be accepted, and also the state committee reports. Motion was seconded and passed.

Auxiliary President's Report—First District

The auxiliary to the First District Medical Society held 4 meetings during the past year (1955-1956).

Our first meeting was a dinner in October at the Gardner Hotel. Mrs. D. L. Gilbert, writer, entertained us with some of her poetry.

Our second meeting was a luncheon in January at the Elks Club. Since this meeting preceded our benefit, we had no program but discussed plans for it.

February 22 we held our second annual dessert, bridge and style show at the Elks Club. It was under the able leadership of Mrs. Robert Story and Mrs. John Gillam. Having gained experience from last year's benefit, we all felt it had been most successful. We had 360 guests and netted \$290 for the scholarship loan fund. The most gratifying aspect was working together on such a project.

Our third meeting was another luncheon, at the Frederick Martin. We were privileged to have our state president, Mrs. Mahoney, as our guest. She inspired us all by the report and her personal remarks. At this meeting, we voted \$75 to the A.M.E.F. to be given in memory of Mrs. W. F. Baillie who passed away March 17. She was largely responsible for organizing the first district. We also voted \$50 to be given to the nursing home drive which is now in progress.

Our last meeting will be an April dinner meeting at the time of the medical society meeting. We will have a program and vote upon our new officers at that time. We have 60 members in the auxiliary. Our *Today's Health* chairman reports 18 subscriptions sold. We have an average attendance of 30 at our meetings.

I feel we could accomplish a great deal more if we were to meet once a month.

Individually the members contribute generously of their time to many worthwhile causes. Some of these are: Opportunity School, Junior Service League, Filter Center, League of Women Voters, Y.W.C.A., Campfire Girls, and Boy Scouts.

Mrs. L. E. WOLD, President

Auxiliary President's Report—Second District

The auxiliary to the Devils Lake District Medical Society held monthly meetings this year, 1955-1956, in the hope that this would enable out-of-town members to attend at least a few of the meetings.

Our membership increased from 16 to 19. We sold 24 *Today's Health* subscriptions, and again this year we were instrumental in having the district medical society place *Today's Health* in every school and library in the district.

Individual members have been very active in local community projects, including Girl Scouts, Cub Scouts, P.T.A. Council, Mother's March of Dimes, Voice of Democracy Speech Contest, Park Board; and one member, Mrs. Engesather, of Lakota, is director of Flickertail Girls State and chairman for the National Music Contest to be held in Los Angeles next fall.

Mrs. J. H. Mahoney was our honor guest at the April meeting. Our project for the student loan fund was a benefit bridge sponsored by the Devils Lake ladies. This netted us \$70. A check for \$100 was sent to the state treasurer, the difference of which came from contributions and our treasury.

Mrs. THOMAS LONGMIRE, president

Auxiliary President's Report—Third District

The auxiliary to the Grand Forks District Medical Society held 4 dinner meetings during the year 1955-1956. Arrangements for the dinners were made by the social committee, headed by Mrs. P. H. Woutat. At each of these meetings we enjoyed an excellent program planned by Mrs. R. O. Goehl and her committee.

A summary of our proceedings might be of interest to others. In October, Dr. T. H. Harwood, dean of the school of medicine, discussed A.M.E.F. research grants and their importance to us and medical education. At our next meeting in November, Riney Goehl, Jr., spoke on "The Experiment in International Living." Through Riney's beautiful kodachrome slides we visited Germany and enjoyed a lovely "Holiday in Europe." This experiment, designed as it is to bring about better understanding among nations, should commend itself to many of our members. At our January meeting, we were honored by the visit of our state president. Mrs. J. H. Mahoney spoke on the significance of legislative measure H.R. 7225. To this same meeting we invited the officers of the Medical Students' Wives Club. Entertainment was provided by Johnny Dark, narrator, who portrayed "Dark Moods." Election of officers and the presentation of annual reports took place at our March meeting. Mrs. Edith Thompson, social editor for the Grand Forks *Herald* was our guest and Miss Marilyn Hoven presented several piano selections. Officers for the year 1956-1957 are: Mrs. W. C. Dailey, president; Mrs. E. L. Grinnell, vice-president; Mrs. T. Q. Benson, secretary (second term); Mrs. W. W. Nelson, treasurer (second term) for a three-year term 1956-1959; and Mrs. W. A. Liebeler, councillor.

Membership in the city of Grand Forks remains 100 per cent. Mrs. Stephen M. Chasten, however, reported that 1 out-of-town member had resigned because of her husband's death. Telephone calls were made to all members and letters were written to all physicians' wives eli-

gible for membership. There are 60 members in good standing in our district.

Our project committee, with Mrs. Frank A. Hill as chairman, did a splendid job. Through their efforts the sum of \$825.30 has been provided for the Sophomore Medical Student Loan Fund. This sum was raised by a bake sale and a valentine supper party for our husbands. The faculty of the school of medicine and their wives supported this activity to the fullest. Acceptance of Mrs. Hill's report was acknowledged by a standing vote of thanks.

Mrs. G. G. Thorgrimsen conducted 2 local programs on mental health in this city. Dr. Leo Froke was the speaker at both.

Mrs. Myron J. Talbert put forth a valiant effort on *Today's Health*. Fifty telephone calls were made and 10 letters written to members. Twenty-one subscriptions were received. One hundred and forty-five letters were written to laymen in Grand Forks County and 6 subscriptions were received. After submitting her report, Mrs. Talbert made a motion to include membership subscriptions to *Today's Health* in our dues and this motion carried.

In response to Dean Harwood's talk on A.M.E.F., several requests were made for memorial cards. Mrs. Charles B. Porter accepted the chairmanship of this for our district.

In the field of nurse recruitment, we provided transportation by means of 2 chartered buses to take nursing students to the Grafton State School for classwork. Mrs. Stratte was responsible for arrangements and she and Mrs. Dailey accompanied the party. Our nurse recruitment chairman also investigated the possibility of future nurses clubs. Some interest has developed but as yet no clubs have been established. Films on Nursing as a Career and Career-Medical Technology were shown on three occasions to groups of teenage girls by Mrs. Stratte.

After the visit of Mrs. Mahoney, Mrs. T. H. Harwood, on behalf of our society, wrote to Senators Langer and Young drawing their attention to the dangers of the disability clause provided in bill H.R. 7225.

Mrs. E. L. Grinnell, our publicity chairman, has established excellent liaison with the public through Mrs. Edith Thompson of the Grand Forks *Herald*.

Not forgetting the value of public relations, our members assisted in the Cerebral Palsy Clinic held here in January. Mrs. W. H. Witherstine arranged the hours for us to serve as registrars during the two-day session. We shall also serve in this capacity for the Cancer Caravan. Individually our members take part in all community campaigns and activities. Many are active in youth organizations, Crippled Children's Society, The American Red Cross, and other auxiliaries. A civil defense program has not been established in our city, but our members are interested and will participate when such a program is inaugurated.

A close link has been established with the Medical Students' Wives Club. Mrs. Harwood and I, as advisors to the group, attend their meetings. In November, as their guest speaker, I stressed the importance of the auxiliary to the American Medical Association. The A.M.E.F. was also discussed and a knowledge of the role this project is playing in their lives at present proved from subsequent comment to offer these young women a sense of security and lessen the worry over the costly training in which they and their husbands are involved. Mrs. Harwood spoke and emphasized the part their members will play as they go on to larger universities. We then discussed ways in which our members could help our doctors' wives of tomorrow. At our November meeting, Mrs.

Harwood reported on this, and it was agreed that our members, in turn, should open our homes to these young wives for their meetings. Mrs. Nelson A. Youngs was hostess to them in January and Mrs. P. H. Woutat in February.

I give my most sincere thanks to the chairmen and committees mentioned, to Mrs. John H. Graham, her splendid telephone committee, and to Mrs. Ralph E. Leigh for the messages sent to our members who were ill.

The success of the past year is due to them and to the good attendance and support of our loyal members.

Mrs. J. D. CARDY, President

Auxiliary President's Report—Fourth District

The auxiliary to the Northwest District Medical Society has had another active and successful year. Our membership has increased from 24 to 30. The "package deal" of \$10 to cover local, state, and national dues and subscriptions to *Today's Health* and the *Bulletin* was used again this year—therefore, our subscription rate is 100 per cent.

By the year's end we will have had 5 dinner meetings with an interesting program presented after the business portion of each meeting. Our programs were varied—some "escape" and some informative—but all most interesting. Mrs. D. J. Halliday of Kenmare presented her delightful slide-talk on the European trip that she and Dr. Halliday took. A new interior decorator told us of the latest trends in his field at our second meeting, and laid out basic color schemes for two homes. We were happy to have our state president, Mrs. James Mahoney, at our January meeting to tell us of the national convention she attended and to urge us ever on in our auxiliary work. The county director of the Ward County Welfare Board, Miss Estelle Krick, spoke to us on the work of the Welfare Board at our March meeting and, at our final meeting in April, we will hear an exchange student from Istanbul, Turkey, Miss Ayca Isbudak, speak on "Woman's Role In New Turkey."

Our 2 principal projects for the year were our student loan fund and San Haven. Funds for the student loan fund were raised this year by a pre-Thanksgiving brunch at the Clarence Parker Hotel on Sunday, to which all doctors and their wives in the Northwest District were invited. Many who were unable to attend sent contributions to our fund. We netted \$245 on this project and added another \$20 from our treasury to make our total contribution \$265.

Our San Haven project is not a money-making one, but good public relations for Northwest District. It consists of a series of several sales sponsored and handled by our women to provide an outlet for the handicraft made by the occupational therapy department at San Haven. All money is returned to San Haven so that more supplies and materials may be purchased.

Several of our members are active in civil defense. Our nurse recruitment committee is planning to have a nurse recruitment tea for all interested high school girls in this area. Letters to our senators regarding H.R. 7225, the bill dealing with the revision of the social security law, were written after the report of our legislative chairman. Our own constitution and bylaws were revised and brought up to date this year. We also served as hostesses for St. Joseph's Hospital Guild and Trinity Hospital Guild.

Many of our members have been active as individuals in community projects to foster good public relations, such as preschool clinics, Mother's March on Polio, Red Cross, Christmas seal sale, Girl Scout leaders, and Cub Scout den mothers.

Needless to say, another successful year of growth and achievement was enjoyed by this auxiliary only because of the wonderful spirit of cooperation by its members.

MRS. V. J. FISCHER, President

Auxiliary President's Report—Fifth District

The Valley City Woman's Auxiliary to the district medical society has 10 active members. Our membership has remained constant during the past year.

We have had 4 meetings this year, usually social get-togethers at one of our homes. The luncheon money donated at these meetings is the source of our contribution to the student loan fund, our special project.

Our *Today's Health* chairman reports 5 renewals and 2 new subscriptions, 1 having been placed in the Valley City Clinic.

We are happy to report that most of our members have worked on Red Cross, cancer, and polio benefits. Some of us help with the courtesy cart and traveling library cart which visit hospital patients each week.

BETTY J. MACDONALD, President

Auxiliary President's Report—Sixth District

The Sixth District Medical Auxiliary this year has 57 members, an increase of 3 from last year. However, since we gained 19 members last year, we are pleased with this number.

During the year we had 4 dinner meetings. Our first meeting was held in November at the Prince Hotel and featured Dr. L. W. Larson, who spoke on his investigation of osteopathic schools made for the A.M.A. The Carillons, a female vocal group, sang beautifully for us. In December, we were entertained by Mrs. Paul Johnson, Mrs. Lyle Limond, and Miss Linda Nelson, who presented a delightful excerpt from *The Old Maid*. The third meeting was held April 10. Our speaker was Dr. Robert Tudor who discussed his work on ulcers in children. Musical entertainment was furnished by a string quartette composed of members of the Bismarck Symphony Orchestra. Our final meeting was held May 2. We elected officers for the coming year and were entertained by a singing skit presented by Mrs. Marlin Johnson, Mrs. Paul Johnson, and Mrs. Clyde Smith.

A well-received innovation this year was a small printed 4-page year book which contained the lists of state and local officers, local chairmen and past presidents, and names and addresses of 1954-1955 members. Programs were also included.

Two student loan fund projects were held. Mrs. P. O. Dahl and Mrs. P. R. Gregware, our student loan fund co-chairmen, planned a turkey smorgasbord for members and their husbands which was given at Apple Creek Country Club in November. They also had a white elephant table, and the total proceeds amounted to \$503.87. Our enthusiastic chairmen arranged a benefit bridge at the Municipal Country Club. We raised enough with this bridge party to bring our contribution total for the year to \$700.

Our members have participated in an impressive variety of civic activities. We were proud that one of us, Mrs. Paul Johnson, was co-chairman of the successful heart fund drive. Several members worked as captains on the drive. Other activities ranged from American Legion social service and rehabilitation chairman to University Women's Career Night planners. Mrs. Carl Baumgartner is chief recruiter and assistant administrative supervisor at the Filter Center. Six to 8 other members also work as members of the Ground Observer Corps. The Red Cross and March of Dimes were aided by our members. Mrs. John Cartwright is literature chairman

of the county cancer society. Volunteer hospital work is done by others of our group.

Mrs. C. J. Peters, *Today's Health* chairman, has been active in trying to reach and obtain renewals from former subscribers in our district. We are proud of the work Mrs. M. M. Heffron is doing as editor of the state *News Letter* this year.

Officers who have served with me this year include: Mrs. R. F. Nuessle, vice-president; Mrs. K. J. Johnson, secretary; and Mrs. A. M. Thompson, treasurer. Their wonderful cooperation has made serving as sixth district president pleasant indeed.

MRS. CLYDE L. SMITH, President

Auxiliary President's Report—Seventh District

Membership: 23. Student loan fund: \$110 raised by cash contributions from each member. *Today's Health* subscriptions: 5.

Future nurses club: Our first meeting was a tea given by the auxiliary. Two auxiliary members attend each meeting. We meet once a month during the school year.

Programs have been: (1) Tour through parts of the State Hospital. (2) Movie on nursing. (3) Lecture by physiotherapist from Crippled Children's School.

There will be two more meetings this year. We also furnish transportation, help plan, and then carry out the program. We have been able only just this year to secure bulletins on programs, etc., for this club so we hope in the future to plan better meetings and programs.

Christmas Baskets: Ten baskets were sent to 2 different families this year; 1 in the city, 1 in the county. These baskets contained food for Christmas dinner, plus many canned fruits and vegetables, clothing for each member of the family, and gifts and toys for the youngsters. We always choose families with young children.

Medical education fund: \$10.00 as a memorial for Dr. George Holt.

State Hospital birthday party: The vocational department at the State Hospital is promoting birthday parties for the patients. Three of our members are wives of doctors at the State Hospital, and they have been active in securing local service clubs and women's clubs to sponsor these parties. One is held each month; small gifts are given; and ice cream, cake, and coffee are served. A program is also presented, which is usually musical. Our organization will discuss plans at our next meeting. About 60 patients attend each party.

Programs for each meeting have been: (1) film taken and shown by Mr. and Mrs. O. Fode of their European and British Isle tour. (2) Christmas tea given by our president. Guest speaker was Mrs. Audrey Mahoney, our state president. (3) Postponed because of snow. We plan and still hope to have a local attorney speak on the Jenkins-Keogh bill. (4) Election of officers—no program.

HELEN BEALL, President

Auxiliary President's Report—Eighth District

Our activities for the past year have not been many nor extensive, but I shall mention the ones in which we have participated. Our first and most helpful one was the so-called "Walking Blood Bank." It is essentially a blood typing program which obtains and maintains accurate records of persons willing to donate blood on short notice.

Our share in the student loan fund was boosted the past year. We helped with the cancer drive physically and financially, and we also helped with the crippled children's clinic.

We have auxiliaries for both hospitals which consist of all the doctors' wives. We feel we do a great deal to help our own hospitals. We have 1 large and 2 small projects per year whereby we earn approximately \$2,000 for each hospital. In the past year, we have bought 2 operating room lights, a recording and receiving machine for operating room use, and an oxygen tent.

MRS. GORDON ELLIS, President

Auxiliary President's Report—Tenth District

We of the Southwestern District have a membership of 22, but due to the fact that we have only 6 meetings yearly, the members voted to meet as a "special" group, having dinner together and later a short business and social meeting in one of our homes.

Although we have not acted as a group, our doctors' wives have been very active individually in worthwhile projects for the community, representing our group in meetings pertaining to the welfare of the community, etc. Several did a great deal of work in organizing the North Dakota State Nurses' Convention last fall. Many are certified "sky watchers" in the newly organized Ground Observer Corps.

One of our meetings was held in conjunction with the Southwest District Society meeting at Bowman, North Dakota, when we were the guests at the opening of the new Tri-State Clinic. Drs. Goulding, Martens, Leemhuis, and their wives, were the hosts and hostesses.

In the future we plan to have our dinners and meetings in our homes, thus allowing us to become a more integrated group.

Our yearly dues are \$10 and we are, therefore, able to make a few donations. This year, we are very proud to report that we have given \$100 to the student loan fund and \$75 to the scholarship fund for practical nurses, St. Joseph's Hospital, Dickinson, North Dakota.

MRS. ROBERT F. GILLILAND, President

Motion was made by Mrs. Clyde Smith that we accept the district presidents' reports. Motion was seconded and passed.

After the coffee break with South Dakota, Mrs. J. H. Mahoney introduced Dr. John Freeman, clinical director, State Hospital, Jamestown. He gave an interesting address on Mental Health.

His definition of mental health and its principles were outlined by Dr. Karl A. Menninger in his book *The Human Mind*. He gave the following definition: "Let us define mental health as the adjustment of human beings to the world and to each other with a maximum of effectiveness and happiness. Not just efficiency, or just contentment or the grace of obeying the rules of the game cheerfully. It is all of these together. It is the ability to maintain an even temper, an alert intelligence, socially confident behavior and a happy disposition; this, I think, is a healthy mind."

The 5 general principles are: (1) Set up as an ideal the facing of reality as honestly and as cheerfully as possible. (2) Cultivate social contacts and cultural developments. (3) Recognize neurotic evasions as such and take advantage of opportunities for sublimation. (4) Learn to know the evidences of mental pathology and how best to deal with them. (5) Assume that the unhappy are always (at least partly) wrong.

South Dakota Auxiliary presented a panel on Public Relations. They stressed that almost every phase comes under the heading of program and public relations. The program consists of planning and study; public relations, the doing. They stated that the possibilities for programs and public relations were unlimited—the most

important thing being the study of the needs in one's own locality.

Also, they stressed the fact that the first requisite is that of being an informed member, especially on medical legislation.

Mrs. Reding, chairman of public relations in the North Central Region, gave statistics from 221 counties on public relations. In our own region, *Today's Health*, nurse recruitment, A.M.E.F., civil defense, and mental health were the topics that aroused the most interest.

They concluded by saying that since the auxiliary was the best tool for good public relations, it was important that we obtain good guest speakers for our meetings and that each auxiliary member invite 3 to 4 lay guests. They also stressed the importance of protecting the freedom of the practice of medicine, and they ended with a quotation, "pain makes you think."

A delightful luncheon and style show was held June 4, 1956, at 1:00 P.M. at the Aberdeen Country Club. South Dakota Auxiliary was in charge of this luncheon. Mrs. A. P. Reding introduced and presented roses to the past presidents of the South Dakota Auxiliary. Mrs. C. A. Arneson introduced and presented roses to the past presidents of the North Dakota Auxiliary.

Mrs. F. F. Pfister, president, South Dakota Woman's Medical Auxiliary, introduced our honored guest and speaker, Mrs. Mason G. Lawson, president of the Woman's Auxiliary to the American Medical Association. She stated that all leadership started at the community level. She stressed the importance of responsible leadership. She stated that if any organization is to survive it must have an orderly process of leadership supported by a background of experience and, most of all, the individual support of every member and that we each have a separate and individual share in making our state and nation all that we wish it to be.

She stated that in reviewing the auxiliary program, she made an interesting discovery; she realized more fully that no project had any financial benefit for any doctor nor any doctor's wife. Every project has been planned to benefit the community in which we live.

She stated that our number one project is medical education.

Our final business session was held June 5 at 9:00 A.M., room "A", Alonzo Ward Hotel. The meeting was called to order by Mrs. J. H. Mahoney, president.

Mrs. V. J. Fischer reported 38 registrants from North Dakota.

The following nominations were made for delegates to attend the A.M.A. Convention to be held in Chicago in June: Mrs. L. E. Wold, Mrs. E. A. Haunz, and Mrs. M. M. Heffron. Motion was made by Mrs. E. T. Keller that we accept these nominations. Motion was seconded and carried.

After discussion of the printing costs of our *News Letters* and of the suggestion that in the ensuing year we print an anniversary issue, Mrs. S. C. Bacheller moved that we send *News Letters* to our present mailing list for another year. Motion was seconded and passed.

Mrs. Mahoney stated that she had sent a \$25 memorial to A.M.E.F. in honor of Mrs. Baillie. Discussion followed in regard to giving each president authority to send a \$25 memorial to A.M.E.F. upon the death of a past president. Mrs. McLan moved that we give each president authority to send a \$25 memorial to A.M.E.F. upon the death of any past president. Motion was seconded and passed.

Memorial services were held for Mrs. Baillie, our second state president, and Mrs. A. A. Kjelland. Mrs. O. A. Sedlak read a poem in memory of Mrs. Baillie. A thank

your note was read from the Baillie family for the memorial contribution.

Mrs. Cardy suggested that we appeal to each district to purchase 2 revised handbooks; 1 each for the president's and secretary's files.

Mrs. Kohlmeier presented the following Proposed Budget for 1956-1957.

Income	
Dues (300 members at \$4.00)	\$1,200.00
State medical contribution toward convention expenses	200.00
	<u>\$1,400.00</u>
Less national dues, 300 at \$1.00	300.00
	<u><u>\$1,100.00</u></u>
Proposed Expenditures	
President:	
National convention	\$265.00
Chicago conference	100.00
Discretionary fund	100.00
Miscellaneous fund	25.00
	<u>\$490.00</u>
President-elect:	
Chicago conference	100.00
Standing and special committees	25.00
News Letter and stationery	200.00
Convention expenses	200.00
Miscellaneous	85.00
	<u><u>\$1,100.00</u></u>

MRS. A. C. KOHLMAYER, chairman
 MRS. R. H. WALDSCHMIDT
 MRS. C. J. BAUMGARTNER
 MRS. V. J. FISCHER

The same finance committee composed of Mrs. Waldschmidt, Mrs. Baumgartner, and Mrs. Fischer was appointed to audit the books.

Mrs. Heffron discussed the importance of having a name for our *News Letter* in order to conform to federal postal regulations. She stated that the name "News, Views and Cues" had been recognized by other states. Mrs. Bacheller moved that we name our *News Letter*, "North Dakota Auxiliary News, Views, and Cues." Motion was seconded and carried.

Mrs. V. J. Fischer read the following resolutions reports:

Resolution

Whereas, the Women's Auxiliary of the North Dakota State Medical Association has through various projects entailing continuous work and effort raised a sum of approximately \$10,000 for their medical student loan fund at the Medical School of the University of North Dakota; and

Whereas, this fund has been of inestimable value to many medical students and to the medical school; and

Whereas, other worthwhile projects such as mental health and nurse recruiting improve the practice of medicine in North Dakota;

Now, therefore, be it resolved: that the Council and the House of Delegates of the North Dakota State Medical Association convey to the Woman's Auxiliary of the State Medical Association their appreciation and thanks for their excellent work and vision in this splendid project; and

Be it further resolved: that a copy of this resolution be directed to the president of the Woman's Auxiliary.

DR. J. C. FAWCETT, chairman of the council

Resolution Report—Auxiliary

I.

Be it resolved: that this convention of the Woman's Auxiliary to the North Dakota State Medical Association

extend to Mrs. J. H. Mahoney its thanks and sincere appreciation for the great service which she has rendered to that group.

II.

Be it resolved: that the Woman's Auxiliary to the North Dakota State Medical Association express grateful appreciation to the city of Aberdeen, South Dakota; the Woman's Auxiliary to the Medical Society of the First District of South Dakota; the North Dakota State Medical Association; the South Dakota State Medical Association; the medical society of the First District of South Dakota; Mr. Lyle A. Limond, executive secretary of the North Dakota State Medical Association; Mr. John Foster, executive secretary of the South Dakota State Medical Association; Mrs. Mason G. Lawson, president of the Woman's Auxiliary to the American Medical Association; Dr. John Freeman, clinical director of the Jamestown State Hospital; Dr. Alonzo P. Peeke, president of the South Dakota State Medical Association; Dr. D. J. Halliday, president of the North Dakota State Medical Association; the North and South Dakota Woman's Auxiliary convention chairmen; Mrs. S. C. Bacheller and Mrs. John Rodine; and all the individuals and groups who contributed to the success of the convention and to the comfort and entertainment of the delegates.

III.

Be it resolved: that the Woman's Auxiliary to the North Dakota State Medical Association express appreciation for the support and cooperation received from all persons, organizations, and agencies who contributed to the success of its program and that of its state and district auxiliaries during the past year.

MRS. L. L. HOOPES, chairman

Mrs. S. C. Bacheller read the following nominating committee report:

Nominating Committee Report

President, Mrs. C. A. Arneson, Bismarck; president-elect, Mrs. J. D. Cardy, Grand Forks; first vice-president, Mrs. V. J. Fischer, Minot; second vice-president, Mrs. J. M. Van der Linde, Jamestown; recording secretary, Mrs. J. W. Jansonius, Jamestown; and treasurer, Mrs. A. C. Kohlmeier, Larimore.

MRS. S. C. BACHELLER, chairman
 MRS. THOMAS LONGMIRE
 MRS. ROBERT GILLILAND

Mrs. J. H. Mahoney then asked for nominations from the floor for each of the above offices. As there were none, she declared the above persons duly elected and instructed the secretary to so record this in the minutes.

Mrs. J. H. Mahoney appointed Mrs. R. D. Nierling, Mrs. G. H. Holt, and Mrs. J. M. Van der Linde on the reading committee.

Mrs. J. H. Mahoney then thanked her assistants. The meeting was then turned over to Mrs. Lawson who congratulated the incoming officers on their new duties and installed them in their offices.

Mrs. J. H. Mahoney turned over the files to Mrs. C. A. Arneson.

After the coffee break with South Dakota, a very interesting panel on legislation was conducted by Mrs. Clyde Smith, Mrs. D. J. Halliday, and Mrs. S. C. Bacheller.

Mrs. Clyde Smith, chairman, gave an interesting discussion on the president's treaty-making powers. She stated, too, that 403 bills pertaining to medicine had been introduced; 284 of which were new bills. She gave 2 reasons why people vote as they do; 1 is logic and the other politics. She stated that we must be able to give intelligent responses to questions, be informed and know

why a provision is good or bad. In regard to legislation she concluded by saying, "While you are watching the front door, be sure and close the back door."

Mrs. Halliday, our second panel speaker, spoke on bill H.R. 7225. She presented the 2 features of the social security amendments, namely: (1) To give full social security to fully disabled people at the age of 50. (2) Reduce the age of social security for women from 65 to 62.

She stated that this bill had become a political football and that it carried a dangerous threat to medicine so subtle that it comes close to socialized medicine. She gave opinions of several doctors. One stated that medical science cannot say when a man is totally disabled. She called this bill the system of the dole, the cradle to the grave program.

Mrs. S. C. Bacheller, third panel speaker, discussed the Jenkins-Keogh Bill. She cited the interesting side-light that this was one of the few positive legislative issues. She quoted that we are not saying, "Please give us security" but rather, "Please let us build our own security."

The bill is designed to permit self-employed individuals to set aside in a restricted retirement fund a limited portion of their income. Of this portion, no tax would be paid in the year it was earned and set aside, but would be paid when the fund is used. The bill would allow annual deductions of 10 per cent of earned net income or \$7,500, whichever is smaller. The total deductions during a taxpayer's lifetime could not exceed \$150,000. The money set aside and excluded from taxable income would have to be paid either to a trust fund established by an association for the benefit of its members or to an insurance company as a premium for a retirement annuity contract.

She discussed the inequitable situation in which the doctors are placed and showed why so few young doctors enter private practice.

She concluded by stressing the importance of our congressmen recognizing the fact that the self-employed is not an insignificant group and our need of a fair tax bill.

Dr. Alonzo P. Peeke, president, South Dakota State Medical Association, and Dr. D. J. Halliday, president, North Dakota State Medical Association, extended their congratulations and greetings to the auxiliaries. Dr. Halliday commended Mrs. M. M. Heffron on her splendid work on our *News Letter*.

Mrs. Stolz, Watertown, South Dakota, discussed the importance of each auxiliary member subscribing to *Today's Health*. She stated that it was an authentic publication full of information and that since it had no news-stand appeal, it was up to every member to work on some phase of *Today's Health* subscriptions. She showed a booklet of the plans that were being formulated for the sale of *Today's Health*.

Meeting was then adjourned.

June 5, at 1:30 P.M., a luncheon was held in Helen's California Kitchen. Entertainment was planned and presented by the Sixth District Auxiliary. Mrs. Paul Johnson gave a reading. Mrs. Clyde Smith, Mrs. C. A. Arneson, and Mrs. Paul Johnson sang a group of entertaining numbers.

Mrs. Mason G. Lawson, our honorary member and our national president, was presented a gift from the North Dakota Auxiliary. Mrs. E. T. Keller made the presentation.

Mrs. P. G. Arzt then presented a gift from the auxiliary to Mrs. J. W. Jansonius, recording secretary. She also read a poem dedicated to Mrs. Jansonius and composed by Mrs. Mahoney.

Mrs. S. C. Bacheller was commended by the group for her untiring efforts in jointly planning a most successful convention.

Postconvention Minutes

Mrs. C. A. Arneson called the meeting to order. She chose as her theme, "Fun, Service and Health."

Discussion followed in regard to a memorial contribution to A.M.E.F. in memory of Dr. F. Daniel Gillis, president, South Dakota State Medical Association. Mrs. R. W. Rodgers moved that we contribute a \$25 memorial to A.M.E.F. in memory of Dr. F. Daniel Gillis. Motion was seconded and carried.

Mrs. J. H. Mahoney will serve as chairman of the nominating committee.

Following is a list of officers, committee chairmen, student loan fund chairman, district presidents and district councillors for 1956-1957:

Officers and State Committee Chairmen, 1956-1957

President—Mrs. Charles A. Arneson,
714 2nd St., Bismarck
President-elect—Mrs. James D. Cardy,
1110 Reeves Drive, Grand Forks
First vice-president—Mrs. V. J. Fischer,
707 3rd St. S.E., Minot
Second vice-president—Mrs. J. M. Van der Linde,
1016 4th Ave. N.E., Jamestown
Recording secretary—Mrs. J. W. Jansonius,
609 4th Ave. S.E., Jamestown
Treasurer—Mrs. A. C. Kohlmeier, Larimore
Committee Chairmen
Organization and membership—Mrs. James D. Cardy,
1110 Reeves Drive, Grand Forks
Program—Mrs. V. J. Fischer, 707 3rd St. S.E., Minot
Public relations—Mrs. Thomas Longmire,
810 6th St., Devils Lake
Legislation—Mrs. Clyde L. Smith,
622 Raymond St., Bismarck
Bulletin—Mrs. Henry Kermott, Jr.,
200 7th Ave. S.E., Minot
Today's Health—Mrs. Duane F. Pile, Crosby
Press and publicity—Mrs. M. M. Heffron,
320 Ave. B, W., Bismarck
Historian—Mrs. G. D. Gertson,
511 S. 5th St., Grand Forks
Revisions, bylaws—Mrs. George H. Holt,
214 2nd Ave. S.W., Jamestown
A.M.E.F.—Mrs. R. W. Rodgers,
146 W. 6th, Dickinson
Parliamentarian—Mrs. S. C. Bacheller, Enderlin
Mental Health—Mrs. J. M. Van der Linde,
1016 4th Ave. N.E., Jamestown
Civil Defense—Mrs. R. F. Gilliland,
228 9th St. W., Dickinson
Rural health—Mrs. Keith J. Vandergon, Portland
Nurse recruitment—Mrs. Edmond Vinje, Hazen
Resolutions—Mrs. L. E. Wold, 1708 9th St. S., Fargo

Nominating Committee

Mrs. James H. Mahoney, chairman, 803 6th St., Devils Lake; Mrs. Robert E. McFadden, 910 3rd Ave. N.W., Jamestown; Mrs. David J. Halliday, Kenmare; Mrs. O. A. Sedlak, 1019 S. 9th St., Fargo.

Student Loan Fund Committee

Mrs. Kenneth E. Fritzell, chairman, 1125 Reeves Drive, Grand Forks; Mrs. Joseph D. Craven, 915 2nd Ave. W., Williston; Mrs. B. A. Mazur, 1237 N. 3rd St., Fargo; Mrs. R. H. Waldschmidt, 600 N. Washington, Bismarck.

District Presidents

First District—Mrs. Lee A. Christopherson, 1307 S. 6th St., Fargo
Devils Lake District—Mrs. C. G. Johnson, Rugby
Grand Forks—Mrs. W. C. Dailey, 1118 Reeves Drive, Grand Forks
Northwest District—Mrs. Samuel Shea, 808 1st St. S.E., Minot
Sheyenne Valley District—Mrs. Neil Macdonald, 711 5th Ave. N.W., Valley City
Sixth District—Mrs. Robert F. Nuessle, 815 Griffin St., Bismarck
Stutsman District—Mrs. Thomas D. Pederson, 416 4th Ave. N.E., Jamestown
Kotana District—Mrs. Gordon Ellis, 602 14th Ave. W., Williston
Traill-Steele District—Mrs. Robert McLean, Hillsboro
Southwestern District—Mrs. Keith Foster, 5 E. 2nd St., Dickinson

District Councillors

First District—Mrs. C. W. Hunter, 1434 S. 6th St., Fargo
Devils Lake District—Mrs. G. N. Vigeland, Rugby
Grand Forks District—Mrs. W. A. Liebeler, 504½ Reeves Drive, Grand Forks
Northwest District—Mrs. Henry Kermott, Jr., 200 7th Ave. S.E., Minot
Sheyenne Valley District—Mrs. Gunder Christianson, 117 N.W. 3rd St., Valley City
Sixth District—Mrs. Oliver DeMouilly, Flasher
Stutsman District—Mrs. Robert E. Lucy, 420 4th Ave. S.W., Jamestown
Kotana District—Mrs. E. J. Hagan, 904 2nd Ave. E., Williston
Traill-Steele District—Mrs. Keith Vandergon, Portland
Southwestern District—Mrs. R. W. Rodgers, 146 W. 6th, Dickinson

1956 MEMBERSHIP ROSTER

WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

Devils Lake District

Bryant, Mrs. Emmett Philip	313 6th St., Devils Lake
Corbett, Mrs. Connor Algermon	316 7th St., Devils Lake
Engesather, Mrs. John A. C.	Lakota
Fawcett, Mrs. John	1125 5th St., Devils Lake
Fawcett, Mrs. Robert M.	719 4th St., Devils Lake
Fox, Mrs. William Richard	315 Foster Ave. S., Rugby
Gilchrist, Mrs. Milton Roy	Rolla
Goodman, Mrs. Edward	Rolla
Hilts, Mrs. George Henry	Cando
Johnson, Mrs. Christian G.	Rugby
Keller, Mrs. Emil Theodore	Rugby
Lazareck, Mrs. Isadore Luke	1032 5th St., Devils Lake
Longmire, Mrs. Lemuel Thomas	810 6th St., Devils Lake
Mahoney, Mrs. James Henry	803 6th St., Devils Lake
Pine, Mrs. Louis Fabien	817 7th St., Devils Lake
Smith, Mrs. Kathleen (Clinton)	Devils Lake
Terlecki, Mrs. Jaroslaw	Minnewaukan
Toomey, Mrs. Glenn W.	Devils Lake
Vigeland, Mrs. George Norman	Rugby

First District

Amidon, Mrs. B. F.	1325 6th Ave. S., Fargo
Armstrong, Mrs. W. B.	1248 N. 9th St., Fargo
Bacheller, Mrs. S. C.	Enderlin
Barnard, Mrs. Donald	1111 S. 7th St., Fargo
Beithon, Mrs. E. J.	Wahpeton
Bond, Mrs. J. H.	516 S. 13th St., Fargo
Burton, Mrs. P. H.	415 S. 8th St., Fargo
Christoferson, Mrs. Lee	1307 S. 6th St., Fargo
Clark, Mrs. Ira	Casselton
Corbus, Mrs. B. C.	1257 N. 4th St., Fargo
Darrow, Mrs. Kent	716 S. 8th St., Fargo
DeCesare, Mrs. F. A.	1401 S. 9th St., Fargo
Fjelde, Mrs. J. H.	1526 S. 8th St., Fargo
Fortin, Mrs. H. J.	1440 S. 8th St., Fargo
Fortney, Mrs. A. C.	1505 S. 12th St., Fargo
Gillam, Mrs. J. S.	1433 S. 7th St., Fargo
Gustafson, Mrs. Maynard	1410 S. 5th St., Fargo
Hall, Mrs. G. H.	1748 S. 9th St., Fargo
Hanna, Mrs. J. F.	907 12th Ave. S., Fargo
Hawn, Mrs. H. W.	1325 N. 1st St., Fargo
Heilman, Mrs. Charles	49 18th Ave. N., Fargo
Houghton, Mrs. J. F.	1707 9th St. S., Fargo
Hunter, Mrs. C. M.	1434 S. 6th St., Fargo
Irvine, Mrs. V. S.	Lidgerwood
Ivers, Mrs. George U.	1106 S. 10th St., Fargo
Jaehning, Mrs. David	Wahpeton
James, Mrs. J. B.	1145 10th St. N., Fargo
Kiesel, Mrs. Ilmar	Page
Klein, Mrs. A. L.	1441 S. 9th St., Fargo
Koons, Mrs. Wilbur	Lidgerwood
Lancaster, Mrs. W. E. G.	1332 No. 5th St., Fargo
Landa, Mrs. Marshall	1335 S. 6th St., Fargo
Larson, Mrs. G. A.	1538 S. 9th St., Fargo
LeBien, Mrs. Wayne	1353 N. 5th St., Fargo
LeMar, Mrs. John D.	1324 N. 5th St., Fargo
Lewis, Mrs. A. K.	Lisbon
Lewis, Mrs. T. H.	1502 S. 6th St., Fargo
Long, Mrs. W. H.	1438 S. 8th St., Fargo
Macaulay, Mrs. W. L.	1410 S. 9th St., Fargo
Mazur, Mrs. B. A.	1237 N. 3rd St., Fargo
Melton, Mrs. F. M.	1545 S. 6th St., Fargo
Nichols, Mrs. W. C.	Gardner Hotel, Fargo
Norum, Mrs. Henry A.	1533 S. 6th St., Fargo
Poindexter, Mrs. M. H.	1350 S. 9th St., Fargo
Pray, Mrs. L. G.	1701 S. 8th St., Fargo
Rogers, Mrs. R. G.	1217 S. 7th St., Fargo
Sedlak, Mrs. O. A.	1019 S. 9th St., Fargo
Schleinitz, Mrs. F. B.	Hankinson
Stafne, Mrs. W. A.	1409 S. 9th St., Fargo
Story, Mrs. Robert	1315 S. 9th St., Fargo
Swanson, Mrs. J. C.	1220 S. 8th St., Fargo
Thompson, Mrs. George	1210 N. 11th St., Fargo
Triggs, Mrs. Perry O.	1401 S. 12th St., Fargo
Urenn, Mrs. B. M.	1005 S. 9th St., Fargo
Veitch, Mrs. Abner	Lisbon
Webster, Mrs. W. O.	823 14th Ave. S., Fargo
Weible, Mrs. R. D.	1628 S. 9th St., Fargo
Weible, Mrs. R. E.	1630 S. 9th St., Fargo
Winge, Mrs. Herbert	Wahpeton
Wold, Mrs. L. E.	1708 S. 9th St., Fargo
Zauner, Mrs. Richard	1005 N. 13th Ave., Fargo

Grand Forks District

Arneson, Mrs. A. O.	419½ S. 5th St., Grand Forks
Benson, Mrs. T. Q.	1524 Walnut St., Grand Forks
Benwell, Mrs. H. D.	625 S. 3rd St., Grand Forks
Berger, Mrs. Phil	221 S. 4th, Grand Forks
Boynton, Mrs. Bruce	935 Kittson Ave., Grafton
Campbell, Mrs. R. D.	323 S. 6th St., Grand Forks
Cardy, Mrs. James D.	1110 Reeves Drive, Grand Forks
Chasten, Mrs. Stephen M.	1101 Reeves Drive, Grand Forks
Countryman, Mrs. George	Grafton
Culmer, Mrs. A. E., Jr.	101 Reeves Court, Grand Forks
Dailey, Mrs. Walter C.	1118 Reeves Drive, Grand Forks
DeLano, Mrs. Robert	Northwood
Flaten, Mrs. A. N.	Edinburg
Fritzell, Mrs. Kenneth	1125 Reeves Drive, Grand Forks
Froke, Mrs. Leo	621 S. 5th St., Grand Forks
Gertson, Mrs. G. D.	511 St. 5th St., Grand Forks
Goehl, Mrs. Reinhold	1015 Reeves Drive, Grand Forks
Graham, Mrs. Charles	923 Almonte, Grand Forks
Graham, Mrs. John	1523 Cottonwood Ave., Grand Forks
Grinnell, Mrs. E. L.	1207 Lincoln Drive, Grand Forks
Harwood, Mrs. Theodore	Belmont Road, Grand Forks
Haugen, Mrs. C. O.	Larimore
Haunz, Mrs. Edwin	1029 Lincoln Drive, Grand Forks
Hill, Mrs. Frank A.	812 Letnes Drive, Grand Forks
Hofto, Mrs. J. M.	321 N. 4th St., Grand Forks
Jensen, Mrs. August F.	1721 Belmont Road, Grand Forks
Kohlmeyer, Mrs. A. C.	Larimore
Landry, Mrs. L. H.	Walhalla
Leigh, Mrs. James A.	606 N. 3rd, E. Grand Forks, Minn.
Leigh, Mrs. Ralph	301 Park Ave., Grand Forks
Liebeler, Mrs. W. A.	Grand Forks
Lommen, Mrs. C. E.	Fordville
Mahowald, Mrs. Ralph	606 S. 5th St., Grand Forks
Moore, Mrs. John	1114 Reeves Drive, Grand Forks
Muus, Mrs. O. Harold	59 4th Ave. S., Grand Forks
Nelson, Mrs. Wallace W.	511 17th Ave. S., Grand Forks
Painter, Mrs. Robert C.	1121 Belmont Road, Grand Forks
Panek, Mrs. A. F.	Milton
Pettit, Mrs. Sam	Rhinehart Drive, E. Grand Forks, Minn.
Porter, Mrs. Charles	1210 Chestnut Ave., Grand Forks
Potter, Mrs. W. F.	2024 2nd Ave. N., Grand Forks
Prochaska, Mrs. L. J.	412 S. 6th St., Grand Forks
Papenfuss, Mrs. Harlan	3220 5th Ave. N., Grand Forks
Quale, Mrs. Victor S.	1621 Belmont Road, Grand Forks
Ralston, Mrs. Lloyd S.	2615 5th Ave. N., Grand Forks
Revere, Mrs. Jack W.	714 Maple Ave., Grand Forks
Ruud, Mrs. Henry O.	1404 Chestnut Ave., Grand Forks
Ruud, Mrs. John E.	1523 Cherry St., Grand Forks
St. Clair, Mrs. Robert T.	919 Letnes Drive, Grand Forks
Sandmeyer, Mrs. John Arthur	1005 Lanark Ave., Grand Forks
Silverman, Mrs. Louis	626 Belmont Road, Grand Forks
Stratte, Mrs. Joseph J.	403 Division St., Grand Forks
Talbert, Mrs. Myron J.	509 S. 3rd St., Grand Forks
Thorgrimsen, Mrs. G. G.	1215 Lincoln Drive, Grand Forks
Turner, Mrs. Robert	1120 Cottonwood St., Grand Forks
Waldren, Mrs. George	403 Division St., Grand Forks
Wasdahl, Mrs. Walter	University Campus, Grand Forks
Witherstone, Mrs. William	214 8th Ave. S., Grand Forks
Woutat, Mrs. Phillip	1205 Lincoln Drive, Grand Forks
Youngs, Mrs. Nelson A.	511 Reeves Drive, Grand Forks

Kotana District

Borrud, Mrs. Chester C.	607 13th Ave. W., Williston
Craven, Mrs. John P.	403 3rd Ave. E., Williston
Craven, Mrs. Joseph D.	915 2nd Ave. W., Williston
Ellis, Mrs. G. E.	602 14th Ave. W., Williston
Fennell, Mrs. William L.	Crosby
Hagan, Mrs. Edward J.	904 2nd Ave. E., Williston
Hagen, Mrs. Joan G.	410 2nd Ave. E., Williston
Johnson, Mrs. Alan K.	1004 4th Ave. E., Williston
Keller, Mrs. John M.	1215 6th Ave. E., Williston
Korwin, Mrs. Justin J.	701 2nd Ave. E., Williston
Lund, Mrs. Carroll M.	701 1st Ave. E., Williston
McPhail, Mrs. C. O.	Crosby
Pile, Mrs. Duane	Crosby
Sathe, Mrs. A. G.	1205 6th Ave. E., Williston
Skjel, Mrs. Donald	623 3rd Ave. E., Williston
Strinden, Mrs. D. E.	1209 1st Ave. E., Williston
Wright, Mrs. W. A.	822 2nd Ave. E., Williston

Northwest District

Amstutz, Mrs. Kenneth N.	505 9th Ave. S.E., Minot
Breslich, Mrs. Paul J.	818 4th St. S.E., Minot

Cameron, Mrs. Angus L. 318 8th Ave. S.E., Minot
 Clark, Mrs. Joseph 5th St. S.E., Minot
 Conroy, Mrs. Martin 821 1st St. S.E., Minot
 Devine, Mrs. John L., Jr. 7 Airview, Minot
 Erenfeld, Mrs. Fred R. 616 Lincoln Ave., Minot
 Fischer, Mrs. Verrill J. 707 3rd St. S.E., Minot
 Gammell, Mrs. Robert T. Kenmare
 Garrison, Mrs. Mahlon W. 621 Mt. Curve S.E., Minot
 Giltner, Mrs. Lloyd A. 1000 4th Ave. N.W., Minot
 Halliday, Mrs. D. J. Kenmare
 Hart, Mrs. George M. 921 2nd St. N.W., Minot
 Hoopes, Mrs. Lorman L. 118 9th Ave. S.E., Minot
 Huntly, Mrs. Wellington B., Jr. 208 7th Ave. S.E., Minot
 Hurly, Mrs. William C. 6 9th St. S.E., Minot
 Johnson, Mrs. O. W. 422 W. 3rd St., Rugby
 Kermott, Mrs. L. Henry, Jr. 200 7th Ave. S.E., Minot
 Kitto, Mrs. William 1021 Central Ave. W., Minot
 Lampert, Mrs. Max T. 101 10th St. N.W., Minot
 London, Mrs. Carl B. 506 Main St. S., Minot
 McArdle, Mrs. John S. 1431 1st St. S.E., Minot
 McDougall, Mrs. James 908 3rd St. S.E., Minot
 Olson, Mrs. Burton G. 629 3rd St. S.E., Minot
 Richardson, Mrs. Gale R. 12 10th St. S.E., Minot
 Shea, Mrs. Samuel 808 1st St. S.E., Minot
 Sorenson, Mrs. Alfred R. 114 6th St. S.E., Minot
 Sorenson, Mrs. Allen Roger 900 1st Ave. S.E., Minot
 Uthus, Mrs. Oliver S. 703 4th St. S.E., Minot
 Veenbaas, Mrs. Fred J. 219 14th Ave. S.E., Minot

Sheyenne Valley District

Brown, Mrs. Frederick 466 4th Ave. S.W., Valley City
 Christianson, Mrs. Gunder 117 N.W. 3rd St., Valley City
 Crosby, Mrs. E. B. 132 S. Central Ave., Valley City
 Gilsdorf, Mrs. W. H. 222 3rd Ave. S.E., Valley City
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Comments concerning this Section, criticisms, or suggestions for papers will be most welcome. Physicians are cordially invited to submit articles pertaining to pain for consideration. All inquiries and manuscripts should be sent to Dr. John S. Lundy, 102 Second Avenue Southwest, Rochester, Minnesota, or to the Editorial Department, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis, Minnesota.

Interspace Reconstruction and Spinal Stabilization After Disk Removal

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IN SPITE OF the excellent results of disk surgery described by some surgeons, an alarming number of patients continue to complain of pain and disability after such an operation. The time lost from work and the limited amount of physical labor the employee can perform after a disk operation have created somewhat of an economic problem. Likewise, the limited number of jobs available and often the difficulty in obtaining any work after a disk operation call for critical evaluation of the procedures performed in the hope of obtaining happier results. The majority of patients with whom I have come in contact, not only those I have operated on myself but those who have had operations elsewhere, even though they are working full time and are quite satisfied with their postoperative results, do complain of occasional or frequent backache or pains and of their limited capacities for lifting, heavy work, extensive bending, or standing for long periods. Patients usually give up sports such as bowling, diving, weight lifting, football, baseball, and basketball.

It was thought that backache after herniation of the nucleus pulposus annulus through the posterior ligament might in part be due to direct involvement of the nerve fibers at the site of herniation. Stabilization failure, narrowing of the interspace with facet irritation or pressure, mild subluxation, inversion or loss of the normal

curve, and muscle spasm all play a part in the production of back pain. This pain often continues after a faulty disk has been removed. With the passage of time, nature usually unites the adjoining vertebrae by arthritic changes. When this occurs, backache lessens and spine immobility increases.

Although the tendency is toward fewer spinal fusions, the problem of spinal fusion after intervertebral disk removal remains somewhat of a controversy. Many surgeons have sought a means of spinal stabilization and intervertebral space preservation. Posterior spinal fusion incorporating the lamina and spinous processes of two or more vertebrae in one bony unit has failed to satisfy physiologic requirements. The bodies of the vertebra and facets are the weight-bearing units of the spinal column. Fixation of the spinous process and lamina has not prevented collapse or loss of the interspace with the upper vertebral body settling on the one below and the subsequent build-up of hypertrophic spurs or ridges in nature's attempt at repair. Narrowing of the interspace with spur or ridge formation results in a diminished size of the neural canal, occasionally with nerve root compression. The ideal objective after removal of a herniated or ruptured disk would be to preserve the normal intervertebral space and nerve foramen with the adjoining vertebrae stabilized and strengthened to prevent postdisk backache and radiculitis. According to Cloward,¹ both he and Van Wageningen, independently of one another, attempted intervertebral fusion with bone blocks. Van Wa-

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genen discontinued the operation because the intervertebral graft worked loose and herniated into the spinal canal to compress the cauda equina. Cloward, however, continued the operation that is now widely known and frequently used. Other procedures that have been used to attempt to maintain the interspace include anterior body fusion, metallic implants, packing the interspace with bone chips to obtain fusion by the method of Briggs and Milligan,² or the insertion of bone pegs into the interspace as described by Owens and Williams.³ This latter procedure was later modified by implanting a prepared bone plug obtained from the ilium into a slightly smaller hole which had been drilled in the interspace and adjoining vertebrae, lateral to the retracted spinal dura. During World War II, I filled the interspace in a series of patients with periosteal scrapings obtained from the spinous process, ilium, or ribs after removal of the disk and cartilaginous plate. The technical difficulties, immediate and postoperative complaints, necessary prolonged immobilization, lack of interspace support, and immediate improvement and failure of adequate follow-up caused me to abandon this procedure. Theoretically, this procedure should be successful if the cartilaginous plates were removed to obtain a vascular field and if complete immobility could be maintained for three months. Gardner⁴ was impressed with the need of interspace support and, utilizing the principle previously advanced of scaffolding the interspace of the spread vertebral bodies, drove prepared lucite pegs, 8 mm. wide and 22 mm. long and slightly greater in width than the spread interspace, into the interspace on each side of the dural sac and retracted nerves. He classified his results in a large number of cases as extremely gratifying. I visited Gardner and observed his technic and was so impressed with the results that I tried it on a small group of patients with more satisfactory results than I had obtained by other means. I had previously used the Cloward technic of implanting either bone pegs from the patient's ilium or bone-bank grafts in an attempt to bring about intervertebral fusion and maintain a normal intervertebral space distance. Despite the attempt to follow Cloward's technic to the finest detail, the end results were not as good as those obtained by Cloward. The results, however, were more satisfactory than those in a much larger series in which simple disk removal had been done. Radiologic follow-up of these patients, however, revealed no evidence of intervertebral bone graft

preservation after one year. In some, the in-driven bone pegs seemed to melt away within a very few months. As this took place, the incidence of postoperative backache increased and, in a few cases, sciatic radiation reappeared. In one patient, in whom pegs were taken from the iliac crest and driven into the spread intervertebral space, partial absorption and posterior herniation occurred, requiring reoperation and removal of the offending peg which had become a splinter. In a second patient, in whom bone bank bone had been used which had been sterile in all preoperative tests, infection occurred and reoperation to remove the infected peg was necessary. This is the only case of operative infection in the author's series. The gratifying results described by Gardner in the use of lucite bone pegs and the highly satisfactory results obtained with acrylic plates for the repair of skull defects by numerous surgeons led me to consider the use of acrylic molded into the interspace to replace a removed disk. The danger of infection, however, from nonsterilized acrylic prevented its use. When sterile methyl acrylic became available, its use in the replacement of the intervertebral disk seemed feasible. Henrichsen and associates⁵ demonstrated that methyl acrylic was suitable for surgery. They showed microscopically that acrylic fixed solidly to bone tissue with no sign of osteitis and that bone tissue formed a lamellar wall around the acrylic.

The lumbosacral disk was removed as thoroughly as possible in a number of dogs and monkeys. The amount and size of the disk in a monkey, however, renders its removal comparable to that in man impossible. Even in large dogs, the size of the nucleus is quite small and compares somewhat with the cervical disk in a small human being. The disks in monkeys and dogs were cleaned out with a curet and narrow rongeurs, and in each one the cartilaginous plate was damaged to some extent. After the disk had been removed, the interspace was spread as widely as possible and freshly prepared acrylic was instilled and molded into the space until completely filled. These animals were studied after one to four months. In one instance, in which the monkey had been sacrificed after two months, the acrylic was found to be fixed to the bodies of the vertebrae. No bone reaction was noted in any of the specimens. This was studied microscopically in a dog after four months. In each animal, the acrylic remained in the interspace as a block holding the vertebral bodies apart. In 1 dog, after the interspace had been

blocked with freshly prepared acrylic, the lamina and spinous processes of 3 adjoining vertebrae were bared of all tissue, and acrylic was molded around the spinous processes and lamina and allowed to harden. This acted as a posterior fusion. When the animal was sacrificed after four months, the locking effect of the acrylic in the spine was very pronounced. There was no visible evidence of injury to either the spinous process or lamina. The muscles were seen to be separated from the acrylic by a thin, grayish-blue fibrin membrane.

Problems confronting the use of acrylic in spinal stabilization were:

1. Would it have deleterious effect on the vertebral bodies or cause toxic or irritating reactions?

2. Would the heat engendered in the polymerization of the acrylic be harmful to surrounding tissues or bone?

3. Could it be removed later if necessary?

4. Would it maintain the interspace and support the body without fracture, crumbling, or wear?

5. Would it remain intact without herniation into the spinal canal from the intervertebral space?

6. Could it be instilled into and molded in the interspace without trauma on the nerve roots, dural sac, or surrounding tissues?

Advantages over other methods would be that:

1. Contact with the entire intervertebral body surface would be complete, molding into each crevice and contour without undue pressure or stress at any point.

2. It should maintain the normal physiologic interspace and prevent hypertrophic or degenerative processes from occurring.

3. It should prevent nerve root pressure by maintaining the intact neural canal free from bone or hypertrophic arthritic spurs.

4. By maintaining the spread interspace and by union with the body of the vertebra, it should firmly stabilize the adjoining vertebrae and prevent facet pressure or irritation.

5. By the aforementioned, it should avoid postdisk backache and radiculitis.

6. It should allow early ambulation and return to full activity.

In answer to the problems, the following facts were obtained:

1. Animal experiments and experiences with the use of acrylic in other parts of the body showed that it did not cause bony damage or toxic or irritating reactions.

2. The heat engendered in the polymerization reached 170° in a series of tests. This degree of heat over a period of five minutes is not sufficient to damage bone. Cool water irrigated over hardening acrylic lowers the external temperature.

3. Cadaver experiments reveal that acrylic could be removed by means of a drill, fine chisel, and suitable forceps without undue trauma to the nerve roots and dural sac.

4. Crush tests proved that the crush strength exceeded any possible stress which would be placed on the vertebral bodies. When two vertebral bodies with an interposed disk were compressed, the bodies were found to compress and shatter, whereas the acrylic remained intact. Also, acrylic acting as a mechanical block in the interspace is not subject to either friction or strain as is the case when it is used for a bony socket within a hip or other form of prosthesis. Wear tests have proved that acrylic withstands wear far beyond that which would occur in any intervertebral space. Crystallization or brittleness which endangers its use in hip or long bone prostheses is not a factor in its use as an intervertebral prop.

5. The natural concavity of the articulating surface of the bodies of the vertebrae together with extension of the molded acrylic lateral to the spinal canal underneath the pedicles locks the acrylic firmly in place so that it cannot possibly move out of the interspace.

6. While cadaver and animal experiments indicated that the technical problems of instilling and molding the acrylic in place were few, actual experience in human beings produced technical difficulties that were mastered with experience.

The disk is removed through a unilateral key-hole laminotomy exposure (figure 1). Repeated bilateral exposures after the disk was removed as completely as possible from the unilateral exposure revealed only a minimum amount of disk tissue remaining and that bilateral exposure was not necessary. The interspace is then spread to its maximum extent with a suitable spreader. After trying many types of interspace spreaders, including several I have devised myself, I now consider the Inghe Lamina Spreader satisfactory. After removal of the disk, the area must be kept completely dry, as blood will float the fresh soft acrylic out of the interspace. Acrylic must be instilled under pressure and forced into all recesses or airlocks may result which would prevent the interspace from becoming completely filled. During this process, care must be taken to prevent its escape through the ligament opening to

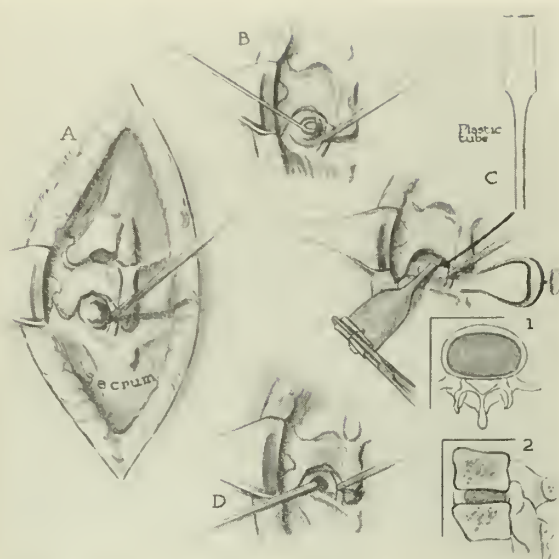


Fig. 1. Steps in removal of ruptured intervertebral disk and reconstruction of interspace. (a). Keyhole laminotomy with removal of ligamenta flava, retraction of nerve root, and exposure of protruding disk. (b). Removal of entire disk except for posterior lateral rims by means of curets and rongeurs. (c). Forced instillation of freshly prepared soft acrylic into the interspace under pressure through a plastic tube inserted into the interspace. Gauze is packed tightly around the tube at its entrance into the interspace to prevent the escape of the acrylic. (d). Tapping the acrylic into all recesses after partial setting. Insets 1 and 2. Diagrams showing acrylic in place in the reconstructed interspace.

lie underneath the dural sac or nerve roots. An excellent method of inserting the acrylic is by means of an R-41 Baxter intravenous tube used in the same manner as a toothpaste tube (figure 2c). Gauze sponges are packed around the tube as it passes through the ligament opening and held firmly in place to prevent escape of the acrylic. The entire procedure, including waiting for the acrylic to harden, adds about one-half hour to the operating time. The immediate postoperative course is not unlike that which follows the simple removal of a protruded or herniated disk. Patients are allowed out of bed as soon as they desire. They are encouraged to walk on the second postoperative day and to start mild bending exercises immediately. They may engage in sports or work from the time of the operation.

SELECTION OF PATIENTS

All patients who now undergo disk operations are given the opportunity to accept or reject methyl acrylic for reconstruction of the interspace. The diagnosis of discogenic disease, including herniation and protrusion or extrusion, is well known. Backache and sciatic radiation aggravated by straining movements are extremely suggestive, if not pathognomonic, of disk pathology with nerve root pressure resulting from

extrusion or herniation of the disk against a nerve root. The objective findings of a flattened lumbosacral curve; possible list of the spine, usually away from the site of pain; limited forward bending and straight leg raising; and pain when a nerve is stretched as in the Lasègue's sign; dermatome hypesthesia; and diminished reflexes are quite characteristic of nerve root impingement. In contrast to spinal cord tumors, the pain is worse when the patient is up and is relieved when at rest. Aggravation of the pain by traction, with the patient either in the flexed or semiflexed position, is indicative of extruded disk fragments which will not sink back in place by any means. So-called conservative or non-surgical therapy for extruded disks seldom accomplishes longstanding relief and only increases the length of time of suffering and disability and the degree of economic and physical cost. Chronic recurring disk disease calls for active treatment, particularly for those people whose economic status depends upon physical activity. Prolonged nonsurgical therapy is more costly and less satisfactory to the patient than active and proper surgical treatment.

The level of lumbar disk herniation can in nearly every instance be established by clinical tests so that myelographic study is seldom necessary for verification. The level of the highest dermatome sensory disturbance is an index of the level of herniation. Whereas motor findings may be difficult to evaluate, sensory findings are usually present and localized. The nerves that lie above the level of herniation or protrusion are free of sensory disturbance, whereas those at and possibly below this level usually show some loss of pain and temperature perception. A pin scratch or the application of cold or heat will be less sensitive over the involved area than over dermatomes above. We have come to rely definitely on the foot dermatomes as being accurate. Hypesthesia in the outer border of the foot represents an S1 nerve root involvement, whereas hypesthesia at the base on the dorsum of the first and second toes occurs in the L5 nerve root or L4 interspace involvement. A disk protruding at L4 may be of sufficient size to compress both the L5 and S1 nerves but will usually spare the root above unless it is large and projects upward. The most common protrusions occur between L4 and L5 and L5 and S1 with about 5 per cent occurring between L3 and L4. The L3 disk tends to rupture in one large piece, whereas the L4 and L5 disks are usually fragmented. Deep pressure or jarring

almost always causes spinal tenderness over and around the involved interspace. Also, jugular pressure, sudden abdominal pressure, or a downward thrust on the shoulders produces pain in the area and along the course of the sciatic nerve. Myelographic studies are avoided when possible because of the danger of chemical radiculitis, which is apt to occur when radiopaque substances are injected into the dural sac, even if completely removed at conclusion of the test.

RESULTS

To date, this operative technic has been performed on 94 patients since June 1954. Of these patients, 11 had had 1 to 4 previous operations. Backache with radiographic evidence of disk disease without sciatic radiation was the reason for 5 operations. Backache, vague bilateral sciatic radiating pains, and demonstrable lumbosacral spondylolisthesis was the cause of 1 operation. The remaining patients were operated on for herniated, protruding, or extruded disks. Of the ruptured disks, 3 were at the L3 and L4 interspace; 26 were at the L4 and L5 interspace; 31 were at the L5 interspace; and 5 had definite herniations at L4 and L5. One of the 5 had an acute rupture and extrusion of the major portions of both the L4 and L5 disks caused by the same lifting accident.

Of the 11 patients who had had previous operations and in whom reconstruction had been undertaken at 1 or more of the interspaces with methyl acrylic, 2 became worse. Both had had 3 previous operations, each resulting in increasing disability. Four were unimproved or only slightly improved. Great improvement was noted in 2, and 3 were benefited to a pronounced degree. Disk operations with interspace reconstruction were performed on 5 patients because of severe backache associated with disk degeneration and narrowing of the interspace. Backache is no longer a major problem with 3 of these patients. A superficial wound infection developed in 1 obese female which persisted and extended down to the muscle layer. After cleaning out this infection, the patient was greatly improved. The other patient continued to complain of backache but to a much lesser degree than before the operation but cannot be classified as

cured. Improvement is thought to be slight in 1 patient with spondylolisthesis, although he considers himself greatly improved. Roentgen changes of decreased bone density occurred in 2 patients three months after instillation of the acrylic. These, however, returned to normal density in six months. In 3 patients who had had multiple operations, reoperations were performed after acrylic instillation because of unsatisfactory results, and the acrylic-filled interspace was reexamined. In each instance, the acrylic was found to be firmly in place, and the interspace was well maintained with movement between the two adjoining vertebrae being imperceptible. No patient has been harmed by the instillation of acrylic. All those operated primarily for extruding disks, with the exception of 1, have had a pronounced benefit. In the 1 exception, the nerve roots were traumatized in removing a massive disk fragment which was wedged underneath the fifth lumbar and first sacral nerve roots. This necessitated a hemilaminectomy with wide exposure before the fragment could be removed. The patient's backache was completely alleviated, but he retains L5 and S1 nerve root weakness, which is now improving.

The results obtained by this method far exceeded those obtained by the author by any other means. Backache has been diminished, being only a minor complaint in a few patients. None has had recurrence of sciatic radiation, and all are allowed to carry on any type of physical activity. The average hospital stay for private patients is eight days; 2 have left on the fourth day. Patients are encouraged to get out of bed the day after operation despite incisional pain and are advised not to restrict their movements.

SUMMARY

Reconstruction of the interspace after subtotal removal of the disk with methyl acrylic has enabled closer approximation of normal physical activity and relief of discomfort than any other means so far used by the author. The results in service or industrial patients compare favorably with those in private noncompensation patients.

Since this article was submitted for publication, 32 additional cases have been operated on with extremely satisfactory results.

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"Good Out of Infinite Pain"*

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WE ARE PLEASED to notice that a contemporary journal has presented a symposium on pain, such as the several symposia on this subject that have been published in *THE JOURNAL-LANCET*. The authors¹ have not attempted to avoid controversy, and it is stimulating to obtain the different viewpoints of a broad general field.

For example, Haugen² remarks that the traditional conception of horizontal compartments of central nervous system function, in which the simple reflex in the cord is the basic factor and the frontal lobes represent the highest development, can be augmented by the concept of a hypothetic vertical organization of the central nervous system as it relates to the transmission and perception of pain. He writes, "To summarize, this concept of organization merely offers a way of thought regarding the functioning of the central nervous system. By visualizing a transactional component interposed between the sensory input and motor outflow, in continuity from 'top to bottom,' we view the working of the nervous system more clearly as a functional whole. We can see how the entire patterning of a complex subjective sensation like pain may be altered by normal or abnormal activity within this diffusion system . . ."

Beecher³ writes on limiting factors in experimental pain. He concludes: "1. The studies of many reliable investigators indicate that the 'normal' experimental pain threshold is neither constant from man to man, nor is it constant in a given individual from time to time. 2. The pain threshold varies widely. This is probably because it does not represent a pure perception. This is an inference based upon its variability; on the anatomic and physiologic evidence that 'processing' of it (reverberation in the nerve nets) occurs at a spinal cord level at the least, and probably higher in the central nervous system, before awareness has been achieved; and finally on the fact that experience and value judgments (conditioning) enter into the determination of the pain threshold. 3. The available data are sufficient to indicate that there is no regularly dependable relationship between anal-

gesic action and the experimental pain threshold in man. There is reason to doubt that there is any reliable correlation between experimental pain threshold level and suffering experienced by a patient. 4. The psychic reaction or processing component in man is the principal site of action of analgesic drugs. This follows since the 'perception' component is not dependably altered by these agents in man. The evidence for this does not rest solely on exclusion, but is supported by the clearly demonstrated effectiveness of 'pharmacologically' inert placebos. The conclusion is also supported by the effectiveness of mood in determining or blocking the pain experience, and by the fact that the attitude of the subject and the significance of the wound can determine the presence or absence of pain. 5. The 'pain' threshold in animals is dependably elevated by most powerful analgesic agents. Recognition should be given to the fact that pain threshold in man represents a value judgment of the cortex, whereas 'pain' threshold in animals is in almost all cases a reflex *reaction* to presumed pain, and generally a spinal reflex. It is not surprising that study of these different things leads to different conclusions. 6. Experimental pain has wide usefulness in man and in animals. It has often been misused, especially in man."

Hardy⁴ inquires into the nature of pain. He summarizes his work thus: "1. An historical review of the concepts of pain and its importance as a moral force has been presented. 'Physical' pain and 'mental' pain have been described in terms of reactions to noxious stimulation and reactions to pain, which together constitute the pain experience of a particular individual under a particular set of circumstances. 2. Uniformity in pain threshold, measured by the thermal radiation method, has been observed in subjects differing in sex, age, race, and cultural background. 3. The thermal pain threshold is reached at a skin temperature of $45 \pm 1.7^\circ \text{C}$., and at this skin temperature, reflexes are stimulated in man and animals (nociception). This temperature is

*A quotation from *The Marshes of Glynn* by Sidney Lanier.

also the threshold temperature for burning the skin. 4. The close connection between thermal pain and tissue damage due to heat was pointed out. Noxious stimulation which gives rise to pain and nociception, having the same threshold and increasing with the rate of tissue injury, is thought to depend upon the excess of destructive over reparative reactions at the pain-fiber ending. 5. Reactions to noxious stimulation and to pain have been discussed in relation to 'experimental' and 'pathologic' pain and the mode of action of analgesic agents."

An unusual but useful commentary is the piece by Harris⁵ on experimental algesimetry and an extension of it to clinical work. He comments: "It seems then, at this writing, that tooth pulp algesimetry affords reliability and reasonably good validity. If a compound relieves clinically occurring pain, it need not necessarily elevate the pain threshold, but if a compound elevates the pain threshold, it should relieve clinically occurring pain. Experience with aspirin exemplifies the former statement, Daprisal the latter."

A provocative consideration is that offered by Eddy⁶ on the search for new analgesic agents. He discusses a number of such agents and presents their structural chemical formulas as well as their chemical names. He gives a brief history of the development of analgesic drugs over the last one hundred and fifty years.

The problem of postoperative pain engages the attention of Keats.⁷ He concludes that "An attempt has been made to collect the large amount of new information which has become available in the past ten years concerning postoperative pain, its characteristics, its use for research, and its treatment. With a better understanding of the postoperative patient, it is hoped that an improved treatment of this common and neglected painful state will result. Part of this improvement awaits the discovery of an ideal analgesic drug, and this challenge remains. The rest awaits the intelligent use of available drugs, good nursing care, and a consideration of the psychologic needs of the patients."

Lemon⁸ investigates the difficult and complex challenge of pain in metastatic cancer. He says

that "A multiphasic approach to cancer pain control is outlined, utilizing prophylactic palliative surgery or x-ray therapy when necessary. Hormone therapy acts synergistically with local irradiation or systemic radiomimetic agents for pain relief from breast, prostate, thyroid, and ovarian neoplasms. Synthetic morphine derivatives often adequately control pain without development of excessive requirements until near the patient's death. Morphine or other opiates remain the best agents for terminal care in cases which have not become tolerant by premature resort to these drugs."

The domain of the anesthesiologist in the management of pain is well set forth by Eckenhoff.⁹ He speaks mostly about block anesthesia and its usefulness against painful conditions, but he also includes some remarks on muscle relaxants.

Addiction can become a formidable complication of the medical use of narcotic analgesic agents, as Rayport¹⁰ emphasizes. "Until such time as a potent, nonaddicting analgesic is found," he observes, "constant care and discrimination must be exercised by the physician administering narcotic analgesics. In the foregoing survey, an attempt has been made to present data toward a rational basis for the prevention of addiction during effective utilization of the narcotic analgesics. While it is no longer necessary to postulate a pre-addiction impulse to use drugs, it appears that drug addiction may develop when individuals with specific psychologic needs are exposed to opiatelike drugs whose specific effects may be particularly valuable to them under suitable circumstances. . . . Since it is usually not possible to identify individuals possessing particular psychologic needs which may make them addicted to narcotics, the physician is urged to hold to a minimum the administration of narcotics in everyday practice."

Scarcely a physician is in practice who is not vitally concerned with a better understanding of problems involving pain, and for this reason a symposium such as this is of practical value to virtually everyone, meaning patient as well as physician. It should be brought to as wide an audience as is possible via the printed page.

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Editorial

PAIN ON THE RUN

WHEN ANESTHESIA first became practicable more than a century ago, surgeons naturally made use of it, for at that time abolition of the pain of surgical operations was the prime problem for both patient and physician. This situation continued for many years. During that time, surgical anesthesia also proved to be of inestimable value to physiologists, since it enabled them to carry out experimental procedures either impossible in previous years or decidedly unsatisfactory because of inordinate trauma to the organisms concerned. Out of the researches of the physiologists and the experimental surgeons came new surgical technics, made possible by adaptations and modifications of anesthesia and anesthetic agents, so that the frontiers of surgery in the human being were constantly advanced. This type of work is still proceeding today with unabated diligence.

But there are many more kinds of pain than the pain of surgical operations—a fact readily recognized by THE JOURNAL-LANCET when it inaugurated a section on pain in 1952. Every

physician encounters pain of some kind, and he perceives, better than anyone else, the magnitude of the problem and the frequency with which it challenges the general practitioner.

Fortunately, in recent years the anesthesiologists and other workers have come stoutly to the aid of the general practitioner. The physician in general practice can do far more to relieve pain—safely and efficaciously—than the surgeon or neurologist could do for their patients twenty or thirty years ago. A multiplicity of agents and technics is now available to the general practitioner, and he can utilize many of them without special training or uncommon skill.

Furthermore, more people are thinking about the general practitioner and his problems. The section on pain in THE JOURNAL-LANCET is an example of the concern for his difficulties. The symposium on pain in a recent issue of *The Journal of Chronic Diseases* is another. We are happy to present in this issue a brief review of the symposium in question, and we hope it will be followed by many more symposia in other journals. Pain is a formidable adversary, but there are moments when there is cause for hope that it is now in retreat.

JOHN S. LUNDY, M.D.

Book Reviews on Pain

"CONTROLLED HYPOTENSION" IN ANESTHESIA AND SURGERY, by DAVID M. LITTLE, JR., M.D., Department of Anesthesiology, Hartford Hospital; formerly, attending anesthesiologist, Grace-New Haven Community Hospital; assistant clinical professor of anesthesiology, Yale University School of Medicine, 1956. Springfield, Illinois: Charles C Thomas, 159 pages. \$4.50.

This book has both an author index and a subject index. It presents a bibliography of 517 references, which in itself makes the book important. The problem of bleeding during surgery is discussed, and the author correctly emphasizes the serious nature of this complication. The important consideration, however, is the author's temperate approach to the double-edged maneuver of reducing the bleeding satisfactorily and at the same time not decreasing blood pressure to a point at which untoward results may ensue.

Various methods of inducing hypotension are discussed, including posture and use of various drugs, and the author has even speculated on reduction of blood pressure by means of spinal anesthesia. Fatal complications are discussed. The indications and contraindications involved in the use of the method are dealt with in a separate chapter.

It is fortunate indeed that this subject has been treated

so adequately and competently by the author, for controlled hypotension is a field in which abuse or faulty understanding of the method decreases the safety of the patient. Actually, at one time this method could be used safely only by those who were thoroughly familiar with the method and highly skilled in applying it. Even now, too much stress cannot be laid upon the factors of caution and moderation when the technic is to be carried out. This book will contribute much to making it possible for less skilled persons to use controlled hypotension with appropriate regard for the safeguards which must be observed in so delicate a procedure.

JOHN S. LUNDY, M.D.

TECHNIQUES AND PROCEDURES OF ANESTHESIA, by JOHN ADRIANI, M.D., director, Department of Anesthesiology, Charity Hospital; professor of surgery, School of Medicine, Tulane University of Louisiana; and clinical professor of surgery and pharmacology, School of Medicine, Louisiana State University, New Orleans, 1956. Springfield, Illinois: Charles C Thomas, ed. 2, 568 pages. \$8.75.

The original edition of this work appeared in 1947. The current edition is the second. The author has enlarged his text and brought it up-to-date. It is a volume that should be very useful to students and of interest to the

more experienced practitioner. A considerable amount of detail is presented, including a table of normal values of various laboratory tests that are of interest. There is a chapter on inhalation therapy and one on resuscitation. Special methods are illustrated, such as hypothermia and hypotension. The author includes intravenous anesthesia. The book is printed on good paper and is indexed extensively.

JOHN S. LUNDY, M.D.

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THE NEUROSURGICAL ALLEVIATION OF PARKINSONISM, by IRVING S. COOPER, M.D., Ph.D., F.A.C.S., director, Department of Neurosurgery, St. Barnabas Hospital; assistant professor of neurologic surgery, New York University, Bellevue Medical Center; associate attending neurosurgeon, Bellevue Hospital; associate attending neurosurgeon, University Hospital, New York City, 1956. Springfield, Illinois: Charles C Thomas, 104 pages. \$8.50.

The author has set forth his 6 principal objectives so well that a paraphrase and quotation from the preface seem the best review of this book. The author has presented: (1) documented evidence that certain neurosurgical procedures are now capable of alleviating advanced parkinsonism in many cases, (2) a synopsis of earlier neurosurgical approaches to the therapy of parkinsonism, as well as the principal contemporary techniques, and (3) a detailed description of the operative techniques which have been developed on his service. These techniques are explained explicitly in an attempt to give the neurosurgeon sufficient information to perform these operations in properly selected cases. In addition, the results in a personal series of more than 125 cases are summarized. His last 2 objectives are described as follows: "To inform members of the medical profession, aside from neurosurgical colleagues, of the therapeutic possibilities in-

herent in the present neurosurgical approaches to parkinsonism. By describing in some detail the case histories and follow-up experience with various types of parkinsonian patients, including both salutary results and complications, I have tried to set forth the present possibilities of benefit, as well as the present risks of surgical therapy. I have also attempted to indicate patients who appear to constitute the most favorable type of case for operation. . . . Finally, an attempt has been made to indicate new avenues of investigation for neurosurgical approaches to the hyperkinetic disorders. Moreover, it is important to note that there are many profitable scientific side streets which have been encountered during the current investigation. The physiologic and psychologic implications of some of the findings in our own cases have been mentioned."

To those who have despaired of help for the parkinsonian patient, it is very encouraging that this book holds out so much hope for progress.

JOHN S. LUNDY, M.D.

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REGENERATION IN THE CENTRAL NERVOUS SYSTEM, by WILLIAM F. WINDLE, Ph.D., Sc.D., chief, Laboratory of Neuroanatomical Sciences, National Institute of Neurological Diseases and Blindness, Bethesda, Maryland, 1955. Springfield, Illinois: Charles C Thomas, 311 pages, \$9.50.

This book was edited by William F. Windle. There are 33 contributors. The study of regeneration in the central nervous system is considered from many aspects, and the subjects are animals, birds, reptiles, fish, and mammals. The book is well indexed and contains an extensive bibliography which should serve as an excellent reference source to anyone who is concerned with regeneration in the central nervous system.

JOHN S. LUNDY, M.D.

Current Literature on Pain

THE ANAESTHETIST AND PULMONARY TUBERCULOSIS, by J. P. DECHENE and FERNANDO HUDON. *Canad. Anaesthetists' Soc. J.* 2:172-177, 1955.

"In this paper, we are going to describe the organization of an Anaesthesiology Department in a modern sanatorium where major chest surgery is done for tuberculosis patients; the description will include the role played by the anaesthetist during the pre-per- and postoperative periods. . . . As many of them represent poor anaesthetic risks, the importance of very attentive preparation of these pulmonary cases will be realized. . . . From the results of . . . [preoperative] examinations, the anaesthetist may arrange a better preparation for the patient, for whom the following things are carried out by the anaesthetist or a qualified person: (1) Restoration of fluid balance (fluid and blood transfusion). (2) Aerosol therapy (streptomycin and Vaponefrin). (3) Postural drainage. (4) Physiotherapy. (5) Preoperative sedation. Our patients under treatment with isonicotinic acid derivatives, especially the isopropyl derivative (Marsilid), have shown oxygenation problems and convulsions at the anaesthetic period. We now routinely

stop this medication one month before the operation in order to avoid such complications. . . .

"As the thoracic operation is taking place in the cardiopulmonary area, which is one of the most reflexogenic zones of the body, both the surgical stimulus and the anaesthetic agents are prone to cause hypotension, bradycardia, arrhythmia, or even cardiac arrest. As a preventive, it might be well to mention preoperative topical anaesthesia of the whole tracheobronchial tree, intercostal nerve blocks, a good plane of general anaesthesia, good oxygenation of the patient, and sometimes an intravenous injection of a ganglioplegic drug. Patients with pulmonary tuberculosis frequently show a reduction of blood volume and anaemia. Replacement therapy with blood, plasma, or plasma expanders and electrolytes is imperative in order to avoid shock and anoxemia. Paradoxical respiration and mediastinal flutter are also serious problems; they can be minimized by intubation techniques, controlled or assisted respiration, and the face down position. Anaesthetic agents are a matter of choice. . . . For intubation, endobronchial anaesthesia with Carlen's tube is our first choice. . . . In children's surgery, the

tracheobronchial tree does not allow any other technique and we still use . . . simple intubations . . . The functions of an anaesthetist are not limited to the choice of good anaesthetic agents. He must also pay a close attention to the heart action and to the arterial oxygen saturation. In this, the cardiograph and the oximeter may prove to be of great help . . .

"For the anaesthetist, the recovery period is as important as the operative one. During the first postoperative hours, the anaesthetist stands by the patient as long as he needs his services. In the following days, in cooperation with the surgeon, the anaesthetist supervises oxygenation, blood transfusion, fluid balance, sedation, aerosol therapy, and physiotherapy."

From LUNDY, J. S., and McQUILLLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1955. Vol. 41. Copyright by J. S. Lundy.

COMPLICATIONS OF REGIONAL ANESTHESIA, by JOHN ADRIANI and MILTON EVANGELOU. *Anesth. & Analg.* 34:96-101, 1955.

"Complications of regional anesthesia may be expected as long as one practices this art. As the dexterity of the operator improves, his incidence of complications decreases. Eventually a state of equilibrium or a point of minimum incidence of complications is reached below which it seems impossible to go. The clinician who claims he has no complications is either no longer performing anesthetic blocks or is not performing a sufficient number to know his incidence of complications. Recently we compiled statistics on the diagnostic and therapeutic blocks performed in our pain clinic at the Charity Hospital for a two-year period. The data regarding complications aroused our interest in this subject. We felt that a review of all complications occurring in this clinic, those occurring in the hands of members of our staff during the past ten years in the operating room, and those of other physicians not on our staff who consulted us concerning their difficulties, might yield useful information particularly from the standpoint of prevention. Most reports on complications of regional anesthesia are concerned with reactions to drugs. Other types have been ignored or given improper consideration. This discussion will be concerned primarily with complications other than drug reactions. In the two-year period studied in the clinic, 1,400 blocks were performed on 513 patients. Over 98 per cent of these blocks were performed by anesthesia residents, with less than 2 per cent being performed by members of the staff for teaching purposes. Of the 1,400 blocks, complications were encountered in 12. . . . The complications referred to us on a consultation basis occurred during blocking by surgical residents, staff physicians, surgeons, interns and other persons not on the anesthesia service. We cannot state what the incidence of complications was in this latter group. The most frequent complication encountered was the inadvertent puncturing of the pleura. This complication may occur in performing paravertebral, intercostal, stellate, suprascapular, supraclavicular or brachial plexus block. This occurred 6 times in the pain clinic, 3 times following a stellate block and 3 times following thoracic paravertebral block. Three of these complications resulted in a partial pneumothorax. It has also occurred 11 times in attempts at brachial plexus blocks being performed for operative procedures. . . .

"The next most frequent, serious complication encountered was high spinal anesthesia following the inadver-

tent instillation of the anesthetic drug into the subarachnoid space. This occurred in two cases in our clinic series. . . . Puncture of the esophagus occurred twice in attempting stellate ganglion block by the paratracheal route. In one instance, a periesophagitis developed which responded to treatment with antibiotics; in the other, the patient reached blood tinged mucus. Antibiotics were also given and no infection developed. . . . Hoarseness due to blocking of the vagus nerve occurred 4 times in our experience in the clinic and operating room. In each instance it was associated with bilateral cervical plexus block—twice for thyroidectomy and twice when being done for diagnostic and therapeutic purposes. This complication occurred using lidocaine. Presumably the ease with which this drug diffuses was responsible for this complication. Osteomyelitis of the body of the vertebrae was called to our attention by consultation in one instance following repeated attempts at lumbar sympathetic block. The second, third and fourth lumbar vertebrae were involved. Multiple punctures had been performed using the same needle. Hematomas occur often in the soft parts in highly vascular areas particularly after repeated attempts. . . . Piercing of a thoracic aneurysm following a paravertebral block for pain occurred once. The needle was promptly withdrawn and fortunately no disastrous results followed. . . .

"Local soreness for a day or more at the site of puncture is an annoying complication and is so commonplace that most operators fail to record it. The etiology is multivariied. It occurred without exception following the use of alcohol and phenol. Repeated needling in attempting to locate bony landmarks accounted for a large number. We were unable to determine the percentage because of the operators failure to record its occurrence. A local abscess followed the use of 5 cc. of efocaine for a stellate ganglion block. . . . The question occasionally arises whether or not relieving a patients' pain is detrimental. For example, some contend that pain of angina pectoris acts as a warning signal and the patient once relieved of this exerts himself beyond his capabilities. Our experience does not support this contention. . . . Syncope is a reaction which is encountered and frequently confused with a drug reaction. The symptoms resemble those of primary shock rather than a local anesthetic drug reaction. . . . We feel distending tissues in a painful area is the precipitating factor. . . . Complications of neurologic nature such as neuritis, palsies, residual paresthesia and so on did not occur except in one case. Injury to the medial cord of the brachial plexus occurred following a brachial plexus block. Transverse myelitis may be a complication of paravertebral block. One case came to our attention on consultation. This followed the injection of a solution of bromsalizol in peanut oil paravertebrally after exploratory thoracotomy. Presumably the drug migrated into the subarachnoid space and caused a paralysis from the waist down. This complication has also been reported following the use of efocaine for the same purpose. Psychic reactions occur frequently. They are difficult to differentiate from those due to drugs and other causes. They may be excitatory or depressive. When a 'reaction' outlasts the usual duration of drug reaction, a psychogenic reaction should be suspected. When a reaction can be reduplicated by the injection of sterile water or sterile saline at subsequent blocks, the diagnosis becomes obvious. In one patient, a period of depression lasted for

seven days following the block. In view of the fact that many of these patients have been referred and have been passed on from one clinic to the other and some were from the psychiatric unit, we found it difficult to evaluate many untoward responses. . . . Complications were unusual after suprascapular nerve block. None were encountered in blocks of the extremities."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Co., 1955, Vol. 41. Copyright by J. S. LUNDY.

RENAL CIRCULATION DURING ANESTHESIA AND SURGERY, by H. E. DE WARDENER. *Anaesthesia* 10:18-33, 1955.

"The following observations were made in order to assess the importance of some of those factors which, though they act primarily during anaesthesia, may possibly influence the onset of acute postoperative renal failure. . . . There is general agreement that except for certain nephrotoxic substances, such as mercury, acute renal failure is usually caused by intense renal ischaemia. For this reason, I shall confine myself to the changes which were made on young healthy males undergoing extensive varicose vein operations or herniorrhaphy, as it was found that these minor surgical procedures did not, in themselves, affect the renal circulation. . . . The effects of both cyclopropane and ether were studied. The anaesthetic depth was gauged clinically, the levels chosen being either very light or very deep. . . . Controlled respiration was carried out during deep anaesthesia. Ether and cyclopropane were administered in closed circuit with 100 per cent oxygen. . . . Ether and cyclopropane produce a marked reduction in renal blood flow; this effect becomes more pronounced the deeper the anaesthetic level. It is not influenced by prolonging the anaesthetic level, and it disappears rapidly when the anaesthetic is no longer administered. Animal experiments suggest that the renal vasoconstriction, by which the renal blood flow is decreased, is neurogenic. . . .

"Rather unexpectedly, most operative procedures do not produce any change in the renal circulation. . . . In one patient, however, traction on the large bowel during an abdominoperineal resection of rectum produced almost complete renal ischaemia for about one hour; recovery to a normal renal blood flow nevertheless occurred within half an hour after the operation. . . . The fall in blood pressure induced by pentamethonium bromide does not affect the renal blood flow of young healthy patients anaesthetized with ether and cyclopropane. There is statistical evidence that the use of hypotensive drugs during anaesthesia is not associated with a higher incidence of renal complications. . . . During anaesthesia the renal blood flow is decreased by the administration of noradrenalin and adrenalin, but increased by methedrine. . . . Controlled haemorrhage of 1 to 2½ litres is used to limit bleeding during surgery. It seemed desirable to study the circulatory effects of this procedure on young, healthy anaesthetised subjects undergoing minor operations before contemplating its use in more serious operations. . . .

"Observations were made on 14 volunteers having extensive varicose vein operations under light anaesthesia. . . . Haemorrhage was produced by venesections varying from 800 to 1,500 ml. at a rate of 1 to 200 ml. per minute and starting 51 to 115 minutes after induction of anaesthesia. In the whole group, the average fall in the predicted blood volume was 23 per cent. In 12 cases,

the mean of two clearance periods immediately preceding venesection, when compared with the two to three periods immediately following venesection, showed that venesection had produced no significant change in renal blood flow. The only change seen at all frequently was a minor reduction in blood flow during venesection. . . . In the remaining 2 subjects, venesection induced a sudden and pronounced fall in blood pressure and heart rate associated with anuria lasting sixteen and seventeen minutes respectively. During the phase of the lowest blood pressure, therefore, renal clearances could not be determined. The content of PAH and insulin in the urine that was passed subsequently, however, suggested that during these anuric episodes there had been much less fall in renal blood flow than might be expected from the fall in blood pressure, and that, therefore, renal vasodilatation very probably occurred. Once the blood pressure and urine flow had been restored by retransfusion, the renal blood flow returned to approximately the same rate as before venesection. . . .

"In 12 cases, the blood pressure and heart rate showed a similar pattern of response to the haemorrhage. . . . During the venesection there was either little change or a moderate fall in blood pressure accompanied by a moderate rise in heart rate. Within a few minutes after the venesection, the blood pressure and heart rate returned to control levels; the average fall in blood pressure and rise in heart rate after venesection being just under 10 per cent. . . . In the other 2 subjects, severe hypotension and bradycardia occurred which responded rapidly to retransfusion. . . . It is still possible that a prolonged period of oligaemia may begin during anaesthesia."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1955, Vol. 41. Copyright by J. S. LUNDY.

THE USE OF SHORT ACTING MUSCLE RELAXING DRUGS IN OBSTETRICAL ANAESTHESIA, by J. W. DENNIS and J. J. CARROLL, *Canad. Anaesthetists' Soc. J.* 2:82-86, 1954.

"Over the past three years the various members of our group have used muscle relaxants combined with light general anaesthesia for 591 deliveries. The first muscle relaxant chosen for study was Sincurine or decamethonium bromide. . . . Sincurine has now been given to 451 obstetrical patients, of which approximately three-quarters were primiparae. The reason for the high proportion of primiparae is that these are the patients who usually present more difficulty at time of delivery and in whom relaxation is more difficult to obtain. . . . The anaesthetic used is a mixture of nitrous oxide and oxygen given in approximately 75-25 concentration. We have found that by increasing the dosage of Sincurine to 3 mg. or more, we are often able to carry the patient through the entire procedure, including the repair of the episiotomy, without resorting to a stronger agent, such as cyclopropane. . . . In this series, 94 per cent of the babies required no resuscitation. Of the remainder, about half had an obvious cause for their difficulty, such as the umbilical cord being pulled tight about the baby's neck. Auscultation of the maternal abdomen in these cases often reveals a slow fetal heart rate prior to delivery. About 3 per cent of babies required resuscitation for no apparent reason. This figure is extremely low. . . . The majority of those writing on Sincurine in recent years feel the placenta is a barrier to its transmission. We concur with this viewpoint. Another advantage of Sincurine is that the obstetrician is nearly

always able to deliver the placenta without delay. This would indicate there was no depression of uterine tone by the Sincurine, and the uterus is able to respond to the injection of Pitocin which is usually given immediately following the birth of the baby. . . . The incidence of episiotomies was not reduced greatly. . . . However, size of episiotomies was markedly reduced.

"When the succinylcholine group of relaxants appeared, we decided to give them a trial to learn if they had any advantages over Sincurine. To date we have used this group on 140 cases. The drugs studied were Anectine and Winthrop 7907, which are both the chloride, and Brevidil which is the bromide. All forms are equally satisfactory, but the dosage of the chloride and the bromide differ slightly in relation to the proportion of the active cation in the two compounds."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Co., 1955, Vol. 41. Copyright by J. S. LUNDY.

MULTIPLE AUTOCLAVING OF DRUGS USED IN SPINAL ANESTHESIA, by A. B. CARTER, C. L. HERBERT, W. S. DEWALD, and A. W. TALLEY. *Anesthesiology* 15:480-483, 1954.

"Because we were under the impression that repeated autoclaving would decrease the potency of local anesthetic drugs, we decided to undertake a study based on the clinical use and chemical analysis of spinal anesthetic drugs which had been heat sterilized on five separate occasions. Lots of procaine (Novocain), 10 per cent solution, in 2 cc. ampules, tetracaine (Pontocaine) in various strength solutions and crystals, and piperocaine (Metycaine), 5 per cent solution, in 3 cc. ampules were autoclaved at 250 F. for thirty minutes at 20 pounds pressure. This procedure was repeated five times over a two-day period, the ampules being allowed to cool to room temperatures between each autoclaving. The ampules were then sent to the manufacturers for analysis by their laboratories. . . . There was no significant alteration in these drugs after multiple autoclaving. One hundred and eighty-six spinal anesthetics utilizing drugs that had been autoclaved five times were given during a three month period starting in November 1951. . . .

"We have compared these with regard to duration of sensory anesthesia with 5,763 spinal anesthetics done in this hospital under similar conditions and for similar procedures, except that the drugs were sterilized in an antiseptic solution. . . . We found no significant increase in the percentage of inadequate spinal anesthesia or failures. . . . To evaluate the possible adverse effects of spinal anesthetic drugs subjected to multiple autoclaving, we compared our series with the 5,763 cases previously mentioned with regard to complications. . . . Incidence of postspinal complications was essentially the same."

From LUNDY, J. S., and McQUILLEN, FLORENCE A.: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1954, Vol. 40. Copyright by J. S. LUNDY.

WHY USE SPINAL ANÆSTHESIA IN OBSTETRICS?

by DOUGLAS BEST. *Canad. Anaesthetists' Soc. J.* 1:10-12, 1954.

"We would recommend to those who oppose spinal anesthesia in obstetrics and elsewhere on the basis of complications which have occurred that they look to their technique before condemning an excellent form of anesthesia. The many good anesthetists who continue to use this method despite the clamour attest to its safety when used properly. In the city of Hamilton [Ontario] we have specialist obstetricians and a gradually increasing number of general practitioners who demand spinal anesthesia in every possible case. We ourselves tend to favour this method for the following reasons: 1. It is the anesthetic of choice for the parturient woman with a full stomach. 2. It is the anesthetic of choice for the heavily sedated patient. 3. It is the anesthetic of choice to control labour and delivery while awaiting the delayed obstetrician. 4. It is the anesthetic of choice in premature deliveries because of the maximal perineal relaxation with no fetal depression. 5. It is the anesthetic of choice in the gravid cardiac patient. 6. It is the anesthetic of preference for cesarean section since it allows a leisurely operation without harm to the child. 7. It is the anesthetic of preference in primiparæ because of the excellent perineal relaxation. 8. It is the anesthetic of preference for many women who wish to share in the experience of child birth. 9. The postpartum period is free of nausea and vomiting; postspinal headache is only a very minor problem in our hospital.

"The following facts and figures are from our experience at St. Joseph's Hospital, Hamilton. In 1953, there were 3,854 deliveries. For these, 1,796 patients had anesthesia with gaseous agents (nitrous oxide with or without cyclopropane), 1,312 had ether, 90 had spinals administered by non-specialist anesthetists. The remainder had spinal anesthesia administered by the anesthetic staff of the hospital. The incidence of true spinal headache was low—about 5 per cent, and a severe headache occurred only once or twice during the year. To establish the incidence of headache for the first months of this year we have gathered data for all cases, without attempting to sort out causes. There were 839 deliveries: 383 patients received gas and 23 complained of headache once or twice; 216 had ether with 2 headaches reported; 201 had spinal anesthesia and 13 complained of headache on 2 or more occasions; while 14 had transient one-day headaches. Most were relieved by A.P.C. & C. tablets, with caffeine sodium benzoate being of additional help to those with the more persistent types. Only 1 was of some severity. We feel that a few points of technique should be emphasized. The most important single point is the very low dosage requirement."

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REFERENCES:

1. J.A.M.A. 159:645 (Oct. 15) 1955.
2. J.A.M.A. 158:386 (June 4) 1955.



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News Briefs . . .

North Dakota

THE NORTH DAKOTA-MANITOBA UROLOGICAL SOCIETY held its annual meeting August 31 at St. Boniface Hospital, St. Boniface, Manitoba. Members elected to office for the following year were: Dr. William Webster, Fargo, president; Dr. Kenneth Darrow, Fargo, vice president; and Dr. Louis F. Pine, Devils Lake, secretary-treasurer.

DR. LORMAN L. HOOPES, of Minot, has been elected a qualified fellow of the International College of Surgeons, Section of Obstetrics and Gynecology.

DR. R. P. FROESCHLE, of Hazen, has been appointed line physician for the Northern Pacific Railroad. Dr. Froeschle recently completed a postgraduate course in anesthesia and dermatology at the University of Wisconsin.

DR. D. W. NAGLE, physician and surgeon in Enderlin for the past seven years, left early in September to accept a Mayo Foundation fellowship in otolaryngology in Minneapolis. Dr. Nagle has been succeeded in practice by Dr. John Choate of Steinbach, Manitoba.

DR. WELDE FREY, whose medical practice was interrupted in 1954 by service with the Air Force, is expected to resume practice in Drayton about December 1.

Minnesota

DR. HERMANN J. MOERSCH, of the Mayo Clinic and the University of Minnesota, was recently awarded the West German Grand Cross of Merit as an outstanding specialist in the field of thorax diseases. The presentation was made at a reception given for delegates to the International Congress of the American College of Chest Physicians which was held in Cologne, Germany.

DR. HERBERT M. HIRSCH, University of Minnesota cancer biologist, was recently awarded a three-year \$18,000 American Cancer Society grant for research. Dr. Hirsch will use his grant to continue his investigations into chemical and biological responses of normal cells and cancer cells.

THE FIRST PAUL A. O'LEARY MEMORIAL LECTURE was given September 8 at the Mayo Clinic during the two-day meeting of the Minnesota Dermatological Society.

(Continued on page 32A)



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1. Goodman, L. S., and Gilman, A.: *The Pharmacologic Basis of Therapeutics*, N. Y., The Macmillan Co., 1955; p. 127.

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NEWS BRIEFS

(Continued from page 30A)

Speaker for the occasion was Dr. Henry E. Michelson, professor of dermatology at the University of Minnesota and a close friend of the late Mayo Clinic physician. The memorial lectureship honoring Dr. O'Leary, longtime head of the section of dermatology at the Mayo Clinic, was established in 1955, after his death July 20, 1955.

DR. W. W. KLIMA, who has served the community of Stewart since 1919, was presented with a television set at a testimonial dinner given recently in observance of his retirement. Most of the physicians in the county were present at the dinner and the open house which followed.

DR. LEONG HOM, stationed for the past two years at the Great Lakes Naval Training Station in Illinois, has returned to his practice at the Battle Lake Clinic.

DR. MARVIN L. STERN, who recently completed a residency in surgery at Mt. Sinai Hospital, Minneapolis, and a refresher course at Temple University Medical School, Philadelphia, has established practice in Mahanomen.

South Dakota

DR. RAYMOND J. GULLY, former superintendent of the State School and Hospital at Cambridge, Minnesota, has joined the staff of the Veterans Administration Hospital at Fort Meade.

DR. PETER K. STEINER, who has been on the staff of the Lemmon Clinic since 1946, has become associated with Veterans Hospital, Sioux Falls, in the department of medicine and surgery.

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- Among the several direct and indirect methods designed to augment the blood supply to the foot and leg, Harold Laufman, M.D., of Chicago, employs the bypass graft without resection. This procedure, which is well tolerated by many poor-risk patients, is described in his paper, "Restoration of Arterial Flow in Ischemic Extremities." Because the technic is relatively simple and the risk negligible, the operation is adaptable to many types of vascular occlusion. It seems superior to resection and end-to-end anastomosis because all collateral channels are preserved, dissection is limited, and the risk of gangrene is practically nonexistent.

- Foreign bodies in the cornea and conjunctiva, chemical injuries of the eyeball, lacerations of the cornea and sclera, and contusion of the globe are among the problems discussed in "Treatment of Eye Injuries" by Robert M. Ramsey, M.D., of Winnipeg, Manitoba. If the eyes were diseased prior to injury, treatment and visual results may be materially affected. Therefore, except in some cases, such as chemical injuries, which demand first-aid treatment, a case history often provides valuable information and should be obtained before diagnosis and treatment are attempted.

- Until recently the surgical management of diverticulitis of the sigmoid has met with general dissatisfaction. However, this reluctance to resort to surgery has been largely overcome of late because of the excellent results obtained with the one-stage resection in patients with unequivocal diverticulitis. Indications for its use and its advantages over multiple-stage procedures are pointed out in "Changing Concepts in the Treatment of Diverticulitis of the Sigmoid" by John M. Waugh, M.D., and Alexander J. Walt, F.R.C.S.(C.), of the Mayo Clinic and Mayo Foundation.

- "Comparison of Reserpine and Harmony (Raunormine) in Psychiatric Patients" by John T. Ferguson, M.D., of Traverse City, Michigan, is a preliminary report of the clinical results obtained with these drugs in a small series of patients. Differences and similarities of action are pointed out. Although statistical conclusions cannot be drawn from so small a group of patients, findings tend to indicate that Harmony may possess some advantages over reserpine.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA

MEDICAL CONTINUATION COURSES

November 5-9—Radiation Therapy for Radiologists

November 19-21—Fractures for General Physicians

December 6-8—Physical Medicine

January 3-5—Urology for General Physicians

January 7-9—Dermatology for General Physicians

January 31-February 2—Emergency Surgery for General Physicians.

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

SECTIONAL MEETINGS


The American College of Surgeons will hold 6 sectional meetings during 1957 in the following cities in the United States, Canada, and Puerto Rico. San Juan, January 16-18; New Orleans, February 4-7; Seattle, February 28-March 2; Washington, D.C., March 18-20; Toronto, March 25-27; and St. Paul, April 8-10. For further information, write Dr. H. Prather Saunders, Associate Director, American College of Surgeons, 40 E. Erie St., Chicago 11.

MEMORIAL LECTURE

The first Jack Friedman Memorial Lecture will be given November 29 at 8:15 P.M. in the Mayo Auditorium, University of Minnesota campus. The lecture will be presented by Dr. Leo G. Rigler, professor and head, Department of Radiology, whose subject will be "Detection of Minimal Disease by Periodic Roentgen Examination." At the time of his death in 1955, Dr. Friedman was one of the twin cities' outstanding radiologists.

ESSAY CONTEST ON CHEST DISEASES

The Council on Undergraduate Medical Education of the American College of Chest Physicians offers 3 cash awards annually for the best contributions by undergraduate medical students on any phase in diagnosis and treatment of chest diseases. First prize will be \$500; second, \$300; and third, \$200. Send 5 double-spaced copies by April 10, 1957, to American College of Chest Physicians, 112 E. Chestnut St., Chicago 11.



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Early Recognition of Malignant Disease of the Upper Respiratory Tract

JEROME A. HILGER, M.D.

St. Paul, Minnesota

IF CANCER of the upper respiratory tract is to be detected in its early stages, every busy practitioner must realize that he will encounter malignant disease in this area. Such an awareness creates an alert state of mind that respects early symptoms and accords them the respect of a thorough examination. In the upper respiratory tract, the latter is predicated upon a good source of illumination and a reasonable degree of adeptness with the necessary instruments. If skill with the head mirror has not been attained or maintained, then resort should be made to a simple headlight. The popular inexpensive model with an adjustable lens, when properly placed low on the forehead at about the level of the glabella, gives an excellent source of light for all necessary examining procedures. It can be placed on a hook beside the examining chair and adjusted to the head and plugged in easily without delay.

Among the routine instruments to be used are the mirrors, both nasopharyngeal and laryngeal. Experience is the only way to attain and maintain skill with these mirrors, which are the most difficult to handle of the examining instruments commonly used in otolaryngology. Except in an occasional case, the examiner who applies his skill regularly does not need to resort to local anesthesia in order to complete the average examination.

JEROME A. HILGER is clinical professor of otolaryngology at the University of Minnesota.

After the examiner's ability to use these instruments is assured, two further principles should be routinely applied. Both concern further identification of an abnormal finding, usually an ulcerous process. The first is the routine application of ordinary blood studies, including white and differential blood counts, and serology examinations in suspicious cases. The second is the readiness to perform a biopsy on any doubtful lesion. Readiness implies a state of mind freed from procrastinating influences and the availability of a biopsy tray, which should be present in every practitioner's office. A 2 per cent solution of cocaine hydrochloride for topical application plus a 1 per cent solution of procaine hydrochloride for infiltration is all the anesthesia that is necessary. A small blade and a grasping forceps may be supplemented by a punch biopsy forceps or a set of skin biopsy punches and a small scissors. This armamentarium, a bottle of formalin, and an available pathologist complete the requisites for good cancer detection work in the upper respiratory tract.

Following are some of the symptoms and principles deserving daily vigilance in office examinations. They are divided according to the area involved for ease of comment and mental order.

NASOPHARYNX

Early symptoms.

1. A unilateral, fluid-filled middle ear, particularly in young or old adulthood, may be the first sign of nasopharyngeal malignancy.

2. A sense of fullness, low tinnitus, and moderate hearing impairment are the symptoms.

3. In all such cases, the nasopharynx should be well visualized.

Late symptoms.

1. A large, firm cervical metastatic node is frequently noted before any symptoms from the primary occur.

2. Where no other primary can be found for a large metastatic node, multiple punch biopsies should be performed from scattered areas of the nasopharynx. Frequently the primary is small and looks like any lymphoid nodule.

3. Involvement of the third, fourth, fifth, sixth, ninth, or tenth cranial nerve by extension through the basal foramina sometimes causes pain or paralysis as the presenting symptom.

4. Postnasal obstruction and "adenoid speech" may be the first symptoms. After age 10, all obstructive "adenoid" tissue should be sectioned.

NOSE AND ETHMOID SINUSES

Early symptoms.

1. Thin, watery, often fetid discharge from one side of the nose.

Late symptoms.

1. Bloody purulent drainage and nasal obstruction. Nasal polyps should be sectioned after removal, especially when they are unilateral. The base is the part to section, hence, these growths should be thoroughly removed.

MAXILLARY SINUS

Early symptoms.

1. None.

Late symptoms.

1. Extension through the region of the alveolus produces tooth pain and is cause for tooth extraction. A long recognition period thereafter is not warranted. The tooth socket does not heal and should be biopsied within a few days.

2. Extension through the buccal sulcus causes bulging above the alveolus. Redness and discomfort due to secondary infection may be present. Primary suppurative maxillary sinus disease does not erode the front wall. Swelling in this area should be investigated as carcinoma until contrary facts are obtained.

3. Extension into the orbit causes swelling of the infraorbital margin and lower lid, and later proptosis occurs. This condition is usually mistaken for osteomyelitis of the maxilla, which is a much more infrequent disease than carcinoma.

4. Extension into the nose results in polypoid vascular masses with bloody, thin, and, often, foul discharge. Simple edematous polypoid nasal mucosa may overlie the malignant basal tissue.

Symptoms.

1. Obvious lesions in the mouth are apparent to direct inspection and palpation. They only require the examiner's foreknowledge that cancer frequently occurs in this area and his willingness to perform a biopsy. Applications of silver nitrate are dangerous placebos for physician and patient.

2. Lesions at the base of the tongue and tonsil may be small and the related metastases may be large. Symptoms are few in the early stages. Mirror examination of the lingual base and direct inspection of the tonsils should be supplemented by finger palpation. Carcinoma in this normally nodular and irregular area can often be felt when it cannot be identified visually.

HYPOPHARYNX

Early symptoms.

1. A sticking or soreness in the lower throat, usually demonstrated by direct finger indication in the lateral neck to a constant point that does not shift and is made more uncomfortable by swallowing. Functional hypopharyngeal symptoms are usually described as a feeling of "lump" in the throat. The lump is not easily localized at a single point and frequently shifts from side to side. Discomfort is relieved by swallowing and becomes worse when the throat is quiescent.

2. Erosions in the area of the glossopharyngeal fold may first present with pain in the ear without throat symptoms.

Late symptoms.

1. A full or gargly sound in the voice. Swallowing is obviously difficult, and pain radiates upward toward the ear.

Good routine examination.

1. *Mirror examination.* Pathology can rarely be seen with light and tongue depressor. If the examiner is unfamiliar with the head mirror, a small headlight, such as the National, should be used for all examinations. A good degree of proficiency can be attained with this light, several mirrors of different sizes, and regular use.

2. *Palpation of the neck.* Over one-half of the lesions in the hypopharynx have metastasized to neck glands of the same side when first seen. The glands are usually firm and in the deep jugular chain at the bifurcation. The frame of the cartilaginous larynx should always be palpated. Fullness along the posterior edge is a common occurrence with lateral hypopharyngeal lesions as is increased separation and firmness between the thyroid and the hyoid in epiglottic and vallecular lesions.

3. *Roentgenograms.* Thick barium often outlines the lateral piriform sinuses of the hypophar-

ynx if the mirror view has not been satisfactory. Esophagrams are important for all patients with vague symptoms of dysphagia or with sensations of a lump in the throat.

4. *Endoscopy.* Neither mirrors nor roentgenograms are complete substitutes for direct endoscopic views in uncertain cases.

LARYNX — TRUE CORD

Early symptoms.

1. In carcinomas of the true cord, 90 per cent arise on or near the free margin. Hoarseness is an early development. It is disastrous to tolerate a residual degree of hoarseness without thorough laryngeal inspection to determine the cause. The majority of laryngeal carcinomas have previously received more or less extensive antibiotic therapy for laryngitis.

LARYNX — SUPRAGLOTTIC

Early symptoms.

1. Usually, the only early complaint is an annoying and ineffectual clearing of the throat.

Late symptoms.

1. Pain on swallowing develops when the lesion is large enough to extend to the pharyngeal brim. It often radiates to the ear. Hoarseness develops when the true cord is involved or when the cricoarytenoid joint becomes fixed. Stridor occurs when the mass is so large that the laryngeal aperture is obstructed.

2. Metastatic glands are present in over one-half of the supraglottic lesions when first seen. Less than 1 per cent of true cord carcinomas have metastasized when first seen.

LARYNX — SUBGLOTTIC

Early symptoms.

1. A mild annoying cough is the only early symptom.

Late symptoms.

1. Stridor, which is sometimes incorrectly called "wheeze." This condition often prompts asthmatic treatment.

MASS IN THE NECK

A firm mass in this region, which is obviously not a secondary inflammatory lymph node, deserves special attention.

Treatment.

1. Thorough and repeated examinations of all primary areas from the thyroid to the nasopharynx and the whole integument of the head should be done before a decision is made to perform a biopsy on the neck mass.

2. Biopsy of the node and closure of the wound can reduce the possibility of cure by ultimate definitive surgery. Therefore, biopsy should not be performed unless the surgeon is prepared to extend the operation as follows.

A. Thyroid and neck are resected if frozen section shows thyroid carcinoma.

B. Biopsy of the nasopharynx in multiple scattered areas is done if frozen section shows metastatic squamous or anaplastic carcinoma or lymphoepithelioma.

C. Radical neck resection is completed if carcinoma is found in the lymph gland in the absence of a visible primary or of positive findings in B above.

D. The special demands of a carotid body tumor or a branchial cyst with pharyngeal extension must be met.

Should the spirit of inquiry lead to the biopsy of a neck mass when an available primary has not been found, the patient's ultimate chance of cure declines sharply unless the surgeon is prepared to carry the procedure through as described.

Bronchography

FRANCIS J. CURRY, Capt., M.C.

Denver, Colorado

BRONCHOGRAPHY demonstrates the radiologic anatomy of the bronchi and their subdivisions, either normal or abnormal, through the introduction of a radiopaque substance into the air passages of the respiratory system. The procedure is important to the physician because it demonstrates or excludes disease and to the surgeon because it localizes the lesion within a particular segment or determines the extent of the disease process. The procedure is beset with many pitfalls. In order to clarify the various steps and create an awareness of the possible errors, an attempt will be made to follow a patient from the time he is prepared for the procedure until after the final bronchogram has been made.

PREPARATION OF THE PATIENT

The lumen of the tracheobronchial tree decreases progressively as the periphery of the lung is neared. Any obstruction in the lumen, especially in the secondary and tertiary bronchi, may result in the contrast medium partially or completely failing to fill distal to that point. The obstruction need not necessarily be pathologic; the accumulation of normal secretions within the smaller subdivisions may be sufficient to cause a complete occlusion of the lumen, producing misleading bronchograms.

In order to avoid this possible error, the patient should be subjected to postural drainage in a head down, face down position twice on the day preceding and once on the day of bronchography. He is placed in this position for fifteen to thirty minutes each time and is encouraged to cough and raise as much sputum as possible. This position drains the posterior portions of the lung, middle lobe, lingula, and lower lobes. The anterior portions of the lungs and the upper lobes are drained in the supine and normal upright positions.

Local inflammatory lesions of the bronchus lead to edema and narrowing of the lumen. Inflammation renders the anesthetic less effective locally, promotes its more rapid absorption, and

thereby increases the danger of toxic reactions. Therefore, these infections should receive maximum treatment before attempting the procedure.

PREMEDICATION

Premedication is essential: (1) to decrease the toxic potential of the anesthetic, (2) to decrease bronchial secretions, and (3) to decrease the cough reflex.

Barbiturates. Animal experiments have shown that adequate amounts of barbiturate decreased to one-fourth the toxic potential of cocaine and local anesthetic agents. If a long-acting barbiturate is used, such as phenobarbital, two hours should elapse before beginning anesthesia. If a short-acting barbiturate is used, such as pentobarbital (Nembutal), an interval of one hour is sufficient.

Atropine or scopolamine. Anesthesia and intubation stimulate the bronchial mucosa to increased secretion, even to the point of frank bronchorrhea in some cases. The accumulation of these secretions within the smaller bronchi may prevent the contrast medium from filling. Atropine or scopolamine decreases and prevents the accumulation of these normal secretions.

Antitussive agents. When the catheter is placed in the trachea and the contrast medium is injected into the bronchial tree, the cough reflex is stimulated. Frequently, after fluoroscopy has demonstrated that the bronchi are well filled with the medium, a paroxysm of coughing is precipitated which results in a poor film. The explosiveness of the cough forces the dye out into the alveolar structures, obscuring the anatomic detail on the finished bronchogram. This is one of the most frequent errors and may be prevented by using codeine.

Furthermore, proper premedication reduces the amount of anesthetic necessary to produce good anesthesia.

ANESTHETIC AGENTS

Cocaine and Pontocaine are the anesthetic agents used most frequently in bronchoscopy and bronchography. Their usage has been accompanied,

FRANCIS J. CURRY, a specialist in pulmonary diseases, is chief of the Tuberculosis Section at Fitzsimons Army Hospital, Denver.

From the Pulmonary Disease Service, Fitzsimons Army Hospital, Denver, Colorado.

not infrequently, by toxic manifestations which vary from mild to severe. Death, either delayed or sudden, has occurred and has usually been attributed to hypersensitivity, idiosyncrasy, or allergy. However, a thorough investigation reveals that the safe dosage has been exceeded in over 90 per cent of such accidents. Therefore, the toxic potential of these drugs is important to determine.

If, for purposes of comparison, procaine is assigned the arbitrary toxicity standard 1, that for cocaine would be 4 and Pontocaine would be 12 to 20. However, these relative values do not hold strictly, since the more potent agents are effective in greater dilutions.

Some factors influencing the toxicity of topical anesthetics are:

1. *The anesthetic agent.* Cocaine is a naturally occurring alkaloid, whereas Pontocaine is a synthetic substance. Very little is known about their mode of action, although they are thought to affect enzyme systems in the nervous tissue. It is the lipid-soluble base, not the water-soluble, that penetrates the nerves. They are rendered inactive in an acid medium, as may be found in an inflamed area. Therefore, larger doses are needed in the presence of infection.

The local action of cocaine is twofold. It penetrates mucous membranes readily and has a direct constricting effect upon the small blood vessels. The latter prevents rapid absorption and makes it more potent by prolonging its activity. In order to obtain this same effect with Pontocaine, epinephrine must be added.

The use of 1 per cent Pontocaine instead of 5 per cent cocaine does not increase the safety factor. The topical application of Pontocaine requires twice as long to produce anesthesia of equal duration.

Local anesthetics are protoplasmic poisons and produce irritation when applied to mucous membranes. This is responsible for much of the discomfort after endoscopy.

In animal experiments, Ireland and associates¹ observed that Pontocaine caused desquamation and swelling of the tracheal mucosa. They postulated that this phenomenon may explain the precipitation of asthmatic attacks in susceptible patients.

These drugs are cortical stimulants in toxic doses. Stimulation may be followed by depression, convulsions, and death. The stimulation begins in the cortex and descends. As depression develops, it follows the same course. A patient may be unconscious with markedly hyperactive lower spinal cord reflexes. Death is usually due to respiratory or cardiovascular failure.

2. *Susceptibility of the patient.* Although some individuals undoubtedly possess a hypersensitivity, idiosyncrasy, or allergy to anesthetic agents, such conditions are exceedingly rare. However, one type of allergic reaction that occurs often is contact dermatitis, which develops in some dentists from repeated contact of their hands with anesthetic drugs and in some patients from the application of local anesthetic ointment.

3. *Total weight of the anesthetic used.* Cocaine has produced severe reactions with doses as small as 20 mg., although 1.2 gm. is ordinarily considered the fatal dose.

The manufacturer of Pontocaine states that not more than 20 mg. should be used in endoscopy. This would be 1 cc. of a 2 per cent solution or 2 cc. of a 1 per cent solution.

In reviewing the literature on Pontocaine anesthesia in bronchoscopy and bronchography, we find the dosage ranges from 17.37 mg. to 300 mg. The consensus is that less than 100 mg. of Pontocaine should be used in topical anesthesia.

Sadove and associates² state that the toxicity of solutions increases in geometric progression with increase in concentration. Thus, a given amount of a 1 per cent solution would be 4 times as toxic as the same quantity of a 0.5 per cent solution, and a 2 per cent solution would be 16 times as toxic as an equal amount of a 0.5 per cent solution.

The addition of epinephrine (1:1000) to a solution of Pontocaine increases its effectiveness, decreases the rate of its absorption, and prolongs its action. Consequently, the drug decreases the danger of a toxic reaction by decreasing the total dosage necessary to produce anesthesia.

4. *Character of the area to be anesthetized.* The mucous membranes of the pharynx, larynx, trachea, and bronchi are highly absorbent. These regions are readily penetrated by anesthetic agents which, thus, gain rapid access to the blood. The presence of inflammation, with its increased blood supply, further accelerates absorption. Indiscriminate injection of large doses of Pontocaine into the tracheobronchial tree greatly increases the chance of a toxic reaction.

5. *Rate of absorption.* The danger of toxic reaction is directly proportional to the rate of absorption. When it exceeds the rate of detoxification and excretion, concentration of the drug in the blood increases and eventually systemic poisoning results. In this respect, Pontocaine is more dangerous than cocaine. Cocaine is detoxified by the liver at the rate of 1 minimum lethal dose per hour.

To summarize, no more anesthetic should be used than will produce adequate anesthesia.

METHODS OF ANESTHESIA

The methods most commonly used to anesthetize the pharynx and larynx consist of spraying, applying the drug directly with cotton pledgets, or a combination of these procedures.

The drug is sprayed with an atomizer directly into the pharynx, onto the base of the tongue, and into the pyriform fossae. The patient is instructed not to swallow during this procedure but to hold the agent in his throat and finally spit it out.

The main objections to this method are:

1. That some of the drug is swallowed, and, in an uncooperative patient, this amount may be significant. Pontocaine, especially, is readily absorbed from esophageal and gastric mucosae.

2. That a larger area is anesthetized than is necessary.

With the cotton pledget method, a smaller amount of drug can be used. The pledget, held firmly in a forceps, is dipped into the anesthetic solution and then pressed against the side of the container to remove any excess. The posterior pharyngeal wall, base of the tongue, and pyriform fossae are then anesthetized by direct application. The pledget must be held far down in each pyriform fossa for one to two minutes to obtain satisfactory anesthesia. This method is more exacting, uses far less drug, and reduces the danger of toxic reaction.

The chief aim of anesthesia is to obliterate the gag reflex and sensory phenomena from the larynx. The former is mediated through sensory fibers in the posterior pharyngeal wall supplied by the ninth, tenth, and twelfth cranial nerves. The latter is supplied by sensory fibers in the superior laryngeal nerve.

INTRODUCING THE CONTRAST MEDIUM

Several methods may be used to inject the contrast medium into the tracheobronchial tree. Generally speaking, the physician should use the method with which he is most skilled.

1. *Subglottic, with a needle through the cricothyroid membrane.* This method is advocated because it is simple and laryngeal trauma is avoided. However, should the patient move, or if the needle slips out of the trachea, the injection will enter the pretracheal tissues. The medium then dissects downward into the mediastinum, where it may produce local inflammation and remain for years. Abscess formation and death have occurred.

2. *Transglottic.* (a). With a syringe and curved cannula, the medium is introduced through the glottis. This technic may cause the beginner difficulty in controlling lobar and segmental filling.

- (b). A catheter is inserted through the nose or mouth into the trachea to within 1 to 2 cm. of the carina. This is the method most frequently used. Both sides, all lobes, and segments may be readily filled, and the medium is easily controlled. The principal objection to this procedure is that sometimes the tube stimulates the cough reflex and bronchial secretions.

3. *Supraglottic.* A catheter is placed in the nose so that its tip just enters the nasopharynx. The patient breathes through his mouth while, at the same time, his tongue is pulled firmly forward so that he cannot swallow. The medium falls either directly into the trachea or into the pyriform fossa and then into the trachea.

This method becomes easy with experience, selective lobar filling is achieved, and the patient is more comfortable.

CONTRAST MEDIA USED

The ideal medium for bronchography would be: (1) nonirritating, (2) capable of filling or outlining the smaller bronchi and bronchioles without filling the alveoli, (3) capable of remaining in the bronchial tree until roentgenograms are taken, (4) consistent in producing adequate diagnostic films, and (5) easy to instill and readily eliminated.

At the present time, 2 iodized oil preparations are in general use—Lipiodol and Iodochlorol.

Lipiodol is 40 per cent iodine in poppy-seed oil. Iodochlorol is a combination of 27 per cent iodine and 7.5 per cent chlorine in peanut oil, which has a lower viscosity and poorer contrast than Lipiodol. Dionosil oil is 30 per cent iodine in peanut oil, which is comparable to Iodochlorol in viscosity and contrast but clears more readily (table 1).

The advantages of the oil preparations are:

1. Moderate viscosity.
2. Excellent contrast.
3. Sufficient time is allowed to take repeated films if necessary.

The disadvantages are:

1. Iodism sometimes occurs. This complication results from the absorption of iodine from the gastrointestinal tract, where it has been set free from the oil by digestive action. The oil is swallowed either during instillation or during elimination from the respiratory tract.

2. Absorption is slow. The oil may not be completely absorbed from the bronchioles and alveoli for months or years.

3. Frequently bronchograms cannot be repeated early.

4. Surgery may be delayed as a result of bronchial irritation, pneumonia, or iodism.

TABLE 1

Agent	Chemistry	Iodine	Viscosity	Absorption time	Water-soluble	Advantages	Disadvantages
Lipiodol	Iodine in poppy-seed oil.	40%	Moderate	Months to years	No	Long usage	1. Iodism. 2. Slow absorption. 3. Inability to repeat. 4. Delay in surgery. 5. Alveolar filling. 6. Simulation of organic obstruction by secretion due to immiscibility.
Iodochloral	Iodine 27%, Chlorine 7.5% in peanut oil.	27%	Less than Lipiodol	Similar to Lipiodol	No	Similar to above.	Similar to above and poorer contrast.
Umbradil Viscous B	Iodopyracet (iodine 49.8%) Diethanolamine salt of Diiodopyridone-N-Acetic acid Carboxymethyl cellulose Xylocaine Sterile H ₂ O qsad 100.	24.9%	Half that of Lipiodol	½ to 4 hours	Yes	1. Rapid absorption. 2. Chemical stability. 3. No iodism. 4. Iodine not freed in lung, blood, or kidneys.	1. More exacting technic for adequate anesthesia. 2. Contrast is poorer than with Lipiodol. 3. Must take x-rays rapidly. 4. Contraindicated in advanced renal disease. 5. Hypertonic; causing coughing.
Ioduron B (Swiss)	Iodopyracet (iodine 49.8%) Carboxymethyl cellulose Wetting agent (nicotinic acid amiden-Cetyl Bromide) Preservative (P-oxybenzoic acid ethers) Sterile H ₂ O qsad 100	24.9%	6 times that of Lipiodol	½ to 4 hours	Yes	1. Same as for Umbradil	Same as for Umbradil
Dionosil (British) Aqueous	N-Propylester of 3:5 diiodo-4-Pyridone-N-acetic acid with a cellulose derivative as a thickening agent. 50% suspension	30%	Less than Lipiodol	4-10 days, usually clears in 4 days.	No aqueous suspension.	1. Free iodine not liberated. 2. Alveolar filling not produced even by mild coughing. 3. No need to hurry with x-rays. 4. Bronchi outlined rather than filled.	1. Caused severe coughing until Xylocaine 2% was used as anesthetic. 2. Pyrexia 3. Less radiopaque than Lipiodol.

Perabrodil (German), Diodone Viscous (French), Methocel Diodrast (American). All similar to Umbradil and Ioduron B.

5. A chronic pulmonary lesion is difficult to follow by roentgenograms after bronchography.

6. Retained oil has been diagnosed as bronchopneumonia, tuberculosis, bronchiectasis, pulmonary fibrosis, calcified nodes, and calcification of the pleura.

7. Alveoli may become filled.

8. Simulation of organic obstruction by secretions due to immiscibility.

9. The bronchi may become flooded, causing atelectasis.

10. Granulomatous reaction and lipid pneumonia.

Although the disadvantages of the oil preparations are numerous and have been recognized for years, these media are used more commonly in the United States than the aqueous. Retained oil should be the only unfavorable effect if the pa-

tient is handled properly. Even this hazard can be reduced to a minimum by avoiding alveolar filling and flooding of the tracheobronchial tree.

Early experiments with the water-soluble substances revealed that the effects of retained oil were not observed, but the viscosity was too low and the agents too irritating. Attempts were made to increase the viscosity by using a variety of substances, such as pectin, acacia, tragacanth, gum arabic, polyethylene glycol, and polyvinyl alcohol. These agents were unsuccessful because of incompatibilities with the contrast substance, the high concentration required to produce the desired viscosity, and the excessive irritation produced by the hypertonic solution.

In 1948, Morales and Heiwinkle³ in Stockholm, and Fischer⁴ in Zurich, working independently, used sodium carboxymethyl cellulose as a vis-

cosifying agent and an aqueous solution of iodopyracet (49.8 per cent iodine) as a contrast medium, producing 2 water-soluble preparations which have been used extensively in Europe. The Swedish medium is Umbradil Viscous B, and the Swiss agent is Ioduron B. Numerous other aqueous media have since appeared which are only slight variants, namely: Dionosil (British), Perabrodil (German), Diodone Viscous (French), and Methocel Diodrast (American).

Experience with aqueous Dionosil in 319 patients at Fitzsimons Army Hospital reveals that reactions are few and that the majority are due to overfilling or flooding of the bronchi. However, mild to moderate bronchospasm, manifested solely by wheezing, was noted occasionally and persisted from one to several hours.

Advantages of the aqueous media are:

1. Rapid absorption, which required one-half to four hours with Umbradil Viscous B and Ioduron B, and four to ten days, usually four days, with Dionosil. Rapid clearing is especially important in: (a) obscure pulmonary disease, (b) cases in which initial bronchograms are unsatisfactory, (c) localization of foreign bodies, and (d) cases in which bronchograms must be repeated the next day.

2. No iodism has been reported.
3. Freedom from systemic toxic effects.
4. No anaphylactic reactions reported.
5. Alveolar filling not produced.
6. No need to postpone surgery.

The disadvantages are that these media:

1. Require more exacting technic.
2. Cause bronchial irritation and cough much more than iodized oils.
3. Require adequate anesthesia. Clinical success with these preparations was not achieved until Xylocaine was added to the media.
4. Are of limited use in children because of the risks of anesthesia.
5. Are contraindicated in advanced renal disease.
6. Should not be used in patients with limited pulmonary function because of the danger of obstruction.

Umbradil Viscous B and Dionosil have viscosities less than Lipiodol, whereas Ioduron B is 6 times as viscous. However, the viscosities may be altered to suit a particular occasion. The addition of carboxymethyl cellulose to Umbradil B increases the viscosity, whereas the addition of iodopyracet to Ioduron B decreases it. In order to obtain the best results with an aqueous medium, its viscosity should be greater than Lipiodol. Otherwise, peripheral and alveolar filling are apt to occur, rather than bronchial outlining.

When using Umbradil B and Ioduron B, the resultant rapid absorption and pronounced coughing necessitate taking the roentgenograms rapidly. The absorption time of these 2 preparations is from one-half to four hours. With Dionosil, however, the cough is controlled by the addition of Xylocaine and the absorption time is from four to ten days, usually four days, so that the roentgenograms may be taken more leisurely. Frequently after twenty-four hours, no trace of Dionosil aqueous can be found roentgenographically in the bronchi.

CONTRAST MEDIA AFTER BRONCHOGRAPHY

The iodized oil is removed by postural drainage without coughing. In this manner, most of it can be removed with only a minimum amount remaining in the bronchial tree. Coughing forces the oil into the alveoli. That which enters the alveolar area is retained and absorbed slowly over a long period of time. This phenomenon is responsible for the elevated blood iodine level for a year or more after bronchography with Lipiodol and Iodochlorol.

The iodopyracet of the aqueous media is absorbed directly from the lungs into the blood stream and excreted by the kidneys. The absorption is increased by pronounced anesthesia and decreased by diseased segments. The iodine is not set free in the lungs, blood stream, or kidneys. The carboxymethyl cellulose is eliminated by coughing.

ANATOMY

Bronchography cannot be performed intelligently without a comprehensive knowledge of the segmental anatomy of the lungs and tracheo-bronchial tree. Such an understanding can be obtained only by direct visualization through the bronchoscope. In this way, the bronchographer becomes acquainted with the location and direction of the divisions and subdivisions of the bronchial tree. Also, he becomes aware of the problems of gravitational flow which are encountered during instillation of the contrast medium.

Anomalies of the lungs and bronchi are common and well described in various works on anatomy. Only the more frequently encountered aberrations will be mentioned.

The anomaly seen most often is the so-called azygos lobe, which is not a true lobe. It is a result of the azygos vein bisecting the right upper lobe during development. The size of the lobe depends upon the aberrant position of the azygos vein. When present, this anomaly is usually found in the medial portion of the right upper lung field and is most often recognized by



Fig. 1 (left). Agenesis of left lung. Patient asymptomatic. Routine anteroposterior chest film revealed emphysematous right lung with shift of heart and mediastinum to the left and absent lung markings in left upper chest. Fig. 2 (right). Agenesis of left lung. Right lateral chest film of same patient.

its fissure which resembles an inverted comma and terminates just above the hilus. There have been 12 cases of left-sided lobe of the azygos vein reported.⁵

Additional accessory lobes are occasionally found in the medial portions of the lower lobes. This anomaly is more frequently found on the right and is known as the cardiac lobe. The lingula of the left upper lobe corresponds to the right middle lobe and may rarely exist as a separate lobe. Supernumerary fissures may develop between any of the bronchopulmonary segments or subsegments producing accessory lobes. The fissure is the accessory; the internal bronchial structure is normal. Agenesis or hypoplasia of a lobe or lung is encountered occasionally.

OUTLINING THE BRONCHIAL TREE

Although each bronchographer has minor variations of his own, the basic principles are the same. He should use the technic with which he is most familiar and obtains the best results.

Before proceeding, the controversial issue of outlining all lobes in a single stage rather than one lung at a time should be mentioned.

The proponents of the single stage contend that this method is better because:

1. The patient is subjected to 1 procedure rather than 2. Therefore, dangers of an anesthetic accident or other unfavorable reactions are reduced.

2. Lateral views of the completed bronchograms are not necessary, since oblique views furnish adequate information.

3. It is more economical.

However, others believe that each lung should be done separately because:

1. Outlining all lobes at one time does not materially decrease the dangers of an anesthetic accident or unfavorable reaction. Furthermore, doing a 5-lobe bronchogram with as little as 20 cc. of Lipiodol produces a significant decrease in pulmonary function.

2. Lateral views, which are not obtainable with the single stage, permit better mapping of the diseased area.

3. The economy is false if necessary information is not obtained from the 1-stage method.

In some circumstances, one method may be superior to the other. For the purposes of screening, when all symptoms, signs, and disease appear to be confined to 1 lobe or 1 lung, the 2-stage procedure is probably preferable and is also indicated in asthmatic patients and those with poor cardiorespiratory function.

Procedure for outlining the right bronchial tree. The right middle lobe bronchus and its subdivisions are outlined first. With the patient in the sitting position, he is instructed to lean forward to the right. Then 2 cc. of the medium is introduced and allowed to gravitate throughout the middle lobe.

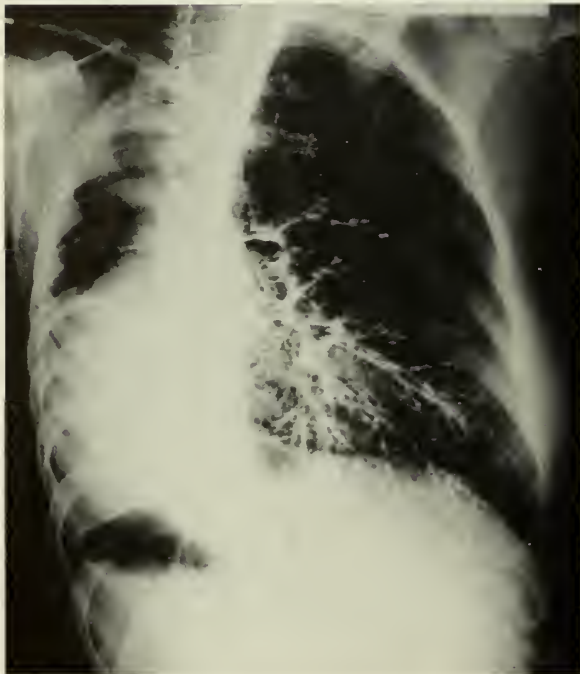


Fig. 3 (above left). Agenesis of left lung. Posteroanterior view. Bronchogram reveals extensive compensatory dilatation of right lung with herniation into left hemithorax and absence of left bronchial markings. Note filling of bronchi with Lipiodol. Fig. 4 (right above). Agenesis of left lung. Right anterior oblique view of same patient. Fig. 5 (left). Agenesis of left lung. Left anterior oblique view of same patient as shown in figures 3 and 4.

The patient then lies on his back and is rotated slightly to the right. The table is elevated so that the shoulders are about 10° above the hips. Another 2 cc. of the medium is injected, which fills primarily the superior and subsuperior segmental divisions of the right lower lobe.

The posterior and lateral basal segments are next outlined by elevating the head of the table to 20° , without changing the position of the patient, and instilling 2 cc. of medium. The anterior and medial basal segments can now be

outlined with an additional 2 cc. of medium by having the patient sit up and bend slightly forward to the right.

The final maneuver is to outline the right upper lobe. With the patient on his right side and the head of the table slightly elevated, 1.5 cc. of medium is introduced. The patient is rotated anteriorly so that the anterior segmental bronchus is filled. Then, while lying on his right side, the final 1.5 cc. of medium is instilled. The head of the table is lowered slightly below the horizontal plane so that the apical segmental bronchus may be outlined. The patient is then turned onto his back and the posterior segmental bronchus is filled.

Procedure for outlining the left bronchial tree. The procedure for outlining the left bronchial tree is essentially the same as for the right, except that the positioning is reversed.

The lingula is outlined first, followed by the left lower lobe, and finally the upper division of the left upper lobe.

The upper lobes are outlined as the final step, because, in the upright position, the bronchi to these areas are drained normally. Consequently, significant lesions may be overlooked, due to removal of the contrast medium before a roentgenogram is taken.

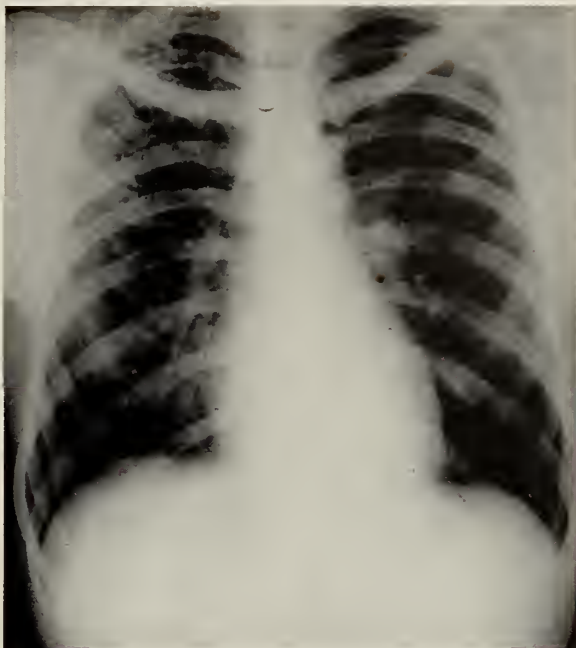


Fig. 6 (left). Lipiodol bronchogram showing extensive alveolar filling in right lower and middle lobes. Fig. 7 (right). Same patient. Residual Lipiodol nine and one-half months after bronchography. Right upper lobectomy was performed for tuberculosis. Residual iodized oil makes this type of case difficult to evaluate.

INDICATIONS FOR BRONCHOGRAPHY

Medical indications. "Chronic pulmonary supuration" suggested by: (1) recurrent pneumonias at the same site, (2) persistent unexplained pulmonary densities, (3) chronic productive cough with localized rales, (4) slow and incomplete clearing of an acute pneumonia, and (5) recurrent pulmonary hemorrhage.

After an acute necrotizing process suggested by: (1) history of aspiration, (2) copious sputum—foul, bloody, or purulent, (3) suggestive cavitation or obstruction by roentgenogram, and (4) slow clinical and roentgen response to treatment.

Surgical indications. (1) Same as medical indications in order to establish diagnosis, (2) to determine extent of the disease process, and (3) to determine exact location of the pathology, either lobar or segmental.

Bronchograms may be helpful in: (1) suspected obstruction, such as tumor or stenosis, (2) suspected bronchopulmonary anomaly, such as cysts or accessory lobes, (3) unexplained x-ray densities, (4) suspected bronchial fistula, and (5) localization of a foreign body.

The diagnosis of bronchiectasis may be strongly suspected from the history, symptoms, and clinical course of the disease, but it can be proved only by bronchography. Furthermore, the extent and definite location of the disease process is clearly outlined. This is of great bene-

fit in determining future treatment. It aids the surgeon in removing all and only the diseased segments, because bronchiectasis is impossible to palpate with certainty in the collapsed lung at operation.

In some cases, bronchography may be the only means of distinguishing bronchiectasis, bronchiolitis, and chronic bronchitis. Although it is rarely needed to establish diagnosis of lung abscess, it may be beneficial in healed or dried-up abscesses to delineate residual cavities or bronchiectasis. Foreign bodies or tumors within the bronchus may produce a filling defect. In healed tuberculosis with persistent sputum and slight hemoptysis and in fibroid or fibrocavernous tuberculosis with negative sputum, bronchograms may demonstrate a complicating bronchiectasis.

Optimum time for bronchogram. (1) After complete baseline films, (2) after bronchoscopy in bleeding or suspected obstruction, (3) after maximum clinical response and x-ray clearing, and (4) after sputum has been reduced to a minimum by treatment.

CONTRAINDICATIONS FOR BRONCHOGRAPHY

Absolute contraindications. (1) Pronounced impairment of the cardiovascular system, (2) marked impairment of pulmonary function, and (3) tuberculosis not under adequate control.

Relative contraindications. (1) History of asthma or other allergies, (2) history of iodine



Fig. 8 (left). Lipiodol bronchogram revealing saccular and cystic bronchiectasis in contracted right middle and lower lobes. Postero-anterior view. Fig. 9 (right). Right lateral view of same patient.

or Pontocaine idiosyncrasy, (3) pronounced debility, (4) impaired cardiovascular system, (5) impaired pulmonary function, such as emphysema, marked fibrosis, missing lobes, or lung, and (6) impaired renal function (iodine clearance).



Fig. 10. Posteroanterior view of right bronchial tree outlined with Dionosil aqueous. Note that this preparation outlines but does not fill the bronchial tree.

In patients with either a decidedly impaired cardiovascular system or markedly impaired pulmonary function, bronchography may produce serious and even fatal reactions. The sedation, manipulation, and introduction of the contrast medium into the tracheobronchial tree may further embarrass a precariously functioning heart or lungs. Zavod,⁶ in 1948, demonstrated that a significant temporary loss of pulmonary function occurred after outlining all lobes of both lungs with 20 cc. of Lipiodol. Spirometric studies, one hour after bronchography, revealed that 85 per cent of the patients experienced an appreciable loss of vital capacity, and 100 per cent had a loss of 35 per cent or more of the residual air. These values returned to normal in three to five days.

In the preantibiotic era, the problem of bronchial dissemination and infection was significant. Bacteria-laden pus from ulcerating lesions or cavities may mingle with the iodized oil and spread to healthy lung tissue. The bacteria and oil remain there for several days, causing infection. However, since patients are now treated to maximum clinical response and until sputum is at a minimum, this problem occurs far less frequently.

The statement that bronchograms are hazardous in tuberculosis is not substantiated by reports in the literature.

Marchese and associates,⁷ in 1952, stated that bronchogenic spread of tuberculosis does not occur in patients with adequately controlled dis-

case. Also, the retention of Lipiodol in the lung does not have an unfavorable effect upon the subsequent course of pulmonary tuberculosis.

They point out further that the presence of positive sputum, pulmonary cavity, and bronchiectasis does not necessarily indicate that bronchogenic spread will occur after bronchography. The resistance of the patient, the virulence of the organism, the size of the inoculum, and the character of the sputum are all important.

Although the majority of severe reactions result from mechanical overfilling, acute status asthmaticus may be precipitated by the introduction of the contrast medium into the tracheobronchial tree. Many of these reactions have been attributed to the presence of iodine in a previously sensitized individual. But, a review of the literature reveals that they occur also in patients whose reaction to iodine sensitivity was negative prior to bronchography.

Criep and Hampsey⁸ reported, in 1937, that iodized oil examinations in 1,205 asthmatic patients did not produce a single fatality. However, in 1946, Mahon⁹ reviewed the literature and found 10 cases of severe reaction. Of these, 5 were fatal. In the fatal cases, 1 was proved at autopsy to be caused by bronchial asthma. In the remainder, death could not be certified as due to iodized oil. The 5 nonfatal cases of severe reaction were the result of acute massive collapse of the lung. Mahon also reported an additional case in which death was due to bilateral tracheobronchial obstruction after Lipiodol bronchography. The obstruction was caused by inspissated mucus, and autopsy findings were suggestive of bronchial asthma.

Although asthmatic attacks may be precipitated, the number of reported fatalities are few. So, patients with a history of asthma or other allergies must be evaluated individually.

The problem of Pontocaine idiosyncrasy has been discussed and that of iodism will be presented under complications.

Cases of impaired pulmonary function due to emphysema, pronounced fibrosis, missing lobes or lungs, and bronchiolitis present problems which must be considered individually. Loss of pulmonary function immediately after bronchography, mechanical overfilling, and obstructive and collapse phenomena ranging from segmental to massive and poor drainage after the bronchograms may produce serious or fatal reactions in these cases.

The relative contraindications must be evaluated upon an individual basis, bearing in mind the history, physical findings, clinical course, and condition of the patient.

COMPLICATIONS DUE TO CONTRAST MEDIUM

Reactions due to iodine. 1. Acute iodism. This condition may manifest itself in several ways:

A. Coryza, tracheitis, and low fever—characteristics are those of a cold. Onset is usually within twenty-four hours but may be delayed for a few days or a week.

B. Swelling of the parotid and submaxillary glands—begins shortly after instillation of the iodized oil and subsides in twenty-four to forty-eight hours. This phenomenon is seen in non-allergic patients. It is the most frequent complication of bronchography seen in the Mayo Clinic, occurring 3 to 4 times a year.

C. Urticaria—usually mild, but may be severe.

D. Papular or pustular skin eruptions—may appear in ten to fourteen days.

2. Sudden death due to anaphylactic shock. Such reports are rare. These cases have been the subject of much discussion, but opinions differ. There has never been a fatal accident after bronchography in the Mayo Clinic.

The reactions due to iodine are usually mild and are not uncommon with the iodized oil media. However, they do not occur as frequently as might be expected. On the other hand, there has been no verified case of acute iodism due to the water-soluble preparations.

Bezancon and associates,¹⁰ in 1935, studied autopsy material of recent and old bronchography and concluded that most of the oil was removed by expectoration. However, a small part was found to be fixed in the alveolar walls by phagocytosis. This portion was gradually broken down by the lipolytic action of the pulmonary parenchyma. Therefore, acute iodism cannot be satisfactorily explained by absorption from the lungs.

It has been noted that during and after bronchography, variable amounts of iodized oil are swallowed. In the gastrointestinal tract, lipolytic digestion frees the iodine which is then absorbed. That this is the most significant factor in the production of iodism is substantiated by the fact that the prevention of swallowing and digestion of the iodized oil eliminates iodine reactions.

Reactions due to unsplit iodized oil. 1. Bronchial obstruction. In a bronchus partially occluded by a tumor or foreign body, the occlusion may be made complete by the introduction of iodized oil. The ultimate effect depends upon whether the bronchus supplies a segment, lobe, or lung. If a primary bronchus is involved, death may result.

2. Mechanical overfilling. In conditions in which the effective respiratory surface is markedly diminished by disease, as in pulmonary fibro-

sis, emphysema, missing lobes or lungs, asthma, and congestive heart failure, mechanical overfilling may lead to serious and fatal results.

3. Acute status asthmaticus. Experiments have shown that the introduction of iodized oil into the tracheobronchial tree stimulates bronchial constriction. In a susceptible individual, this may precipitate or aggravate an asthmatic attack. An additional aggravating or precipitating factor may be the local presence of Pontocaine.

4. Bronchial spread of infection. Bacteria-laden pus may mingle with the iodized oil and spread to healthy lung tissue where it may remain for several days, setting up infection. Since the era of antibiotics, this complication presents less of a problem.

5. Retained iodized oil. Mechanical and alveolar filling and inadequate removal by postural drainage after bronchography lead to retention of iodized oil in the bronchioles and alveoli. The oil is phagocytized and carried into the alveolar walls and interstitial tissues where it may remain for months or years. In this location, it obscures the detail of later chest films and has been diagnosed as bronchopneumonia, tuberculosis, bronchiectasis, pulmonary fibrosis, calcified nodes, and calcification of the pleura.

6. Pneumonitis. Pneumonia, developing two to ten days after bronchography, is characterized by inflammatory changes which are well localized to areas in which oil is retained. Onset is accompanied by chills, fever, and malaise. The attack varies in severity to the amount of oil retained.

7. Lipoid granuloma. This condition, due to iodized oil, is usually cited as one of the complications of bronchography. A review of the literature reveals that only 10 such cases have been reported, indicating that this complication must be very rare. A search of the pathology files at Fitzsimons Army Hospital fails to reveal any such case.

Pinkerton,¹¹ in 1928, studied the reaction of lungs of dogs and rabbits to various oils. He found that most vegetable oils, including iodized poppy-seed oil and iodized sesame oil, produced practically no reaction even though retained for a considerable time. Also, mineral oil was rapidly emulsified and taken up by phagocytes which collected in large numbers, filling the alveoli and producing consolidation. This was later followed by fibrosis. Furthermore, animal oils produced solid yellowish regions in the lungs. Microscopically, these areas showed masses of oil surrounded by a tubercle-like granulomatous reaction made up of giant cells and mononuclear phagocytes with occasional regions

of necrosis, particularly when animal oils containing a high percentage of fatty acids were used. He found that the reaction of the lungs to an oil varied directly with the free fatty acid content of that oil. The simple vegetable oils, which have a very low content of free fatty acid, were little affected by the lipase activity of the lungs and were quite safe for use.

Brown¹² reported that iodized oil in healthy alveoli stimulated a mononuclear infiltration of the large phagocytic type and that these cells were the primary factor in removing the oil from the alveoli, carrying it along the lymphatics to the hilar lymph nodes.

Gowar and Gilmour,¹³ in 1941, found that the only effect that could be definitely attributed to the iodized oil was the presence of epithelioid cells which formed nodules. They found little evidence of phagocytosis and no evidence of removal of oil by migration of phagocytes.

Brody,¹⁴ in 1943, described a case of focal lipid granulomatosis which was discovered at surgery one month after bronchography with Lipiodol. Storrs and associates,¹⁵ in 1949, described a case of lipoid granuloma of the lung following bronchography with Iodoehloral. In 1953, Felton¹⁶ found 6 cases of Lipiodol granuloma in 37 lung specimens selected at random from 34 patients who had had intratracheal injections of oil three weeks to forty-seven months prior to surgery. The specimens varied from a single segment to an entire lung. Bronchiectasis was present in all specimens, and all contained some areas of organizing pneumonitis. In 3, there was a chronic lung abscess in addition to bronchiectasis.

The pathologic picture was similar in all of these cases. Grossly, numerous firm, ovoid, sharply circumscribed, gray-brown or yellow-gray nodules were found throughout the affected tissue, but especially subpleurally. The size varied from 1 mm. to 1.5 cm. in diameter. Microscopically, the nodules consisted of tubercle-like structures, the centers of which contained fat globules. Multinucleated foreign-body giant cells surrounded many of the fat globules, which, in turn, were surrounded by epithelioid cells and macrophages, with a peripheral rim of lymphocytes and fibroblasts.

Storrs and associates¹⁵ postulate that the granulomatous reaction occurring in their patient may have been due to a very high degree of lipase activity within the pulmonary parenchyma. Thus, irritating fatty acids were released, which caused necrosis and led to the formation of a granuloma.

Felton,¹⁶ however, thought it significant that in all of the patients in his series in whom Lip-

iodol granulomas developed, the degree of bronchiectasis was slight and bronchiolitis and emphysema were prominent. Radiographic evidence shows that Lipiodol is retained longer in emphysematous regions than in normal lungs or large bronchiectatic sacs. Retention is greater in emphysema due to bronchiolar narrowing and poorer drainage of the iodized oil from beyond that point. Felton observed, also, that Lipiodol is not eliminated through the lymphatics, but entirely by way of the tracheobronchial tree.

Reactions to water-soluble preparations. 1. Bronchial irritation. These media are hypertonic solutions which induce pronounced coughing and bronchospasm. In early clinical trials, the coughing was so severe that adequate bronchograms could not be obtained. This serious contraindication to their use was overcome, in part at least, by the addition of Xylocaine to the preparation. However, bronchospasm may persist for several hours after instillation and is manifested by wheezing and prolonged inspiration.

2. Bronchial obstruction and mechanical overfilling. The problems arising from these complications are the same as those resulting from use of iodized oils. There is, perhaps, greater danger with the carboxymethyl cellulose compounds because of the increased viscosity.

3. Response of the lung to the aqueous preparations. Hellstrom and Holmgren,¹⁷ studying the effects of Umbradil, found changes similar to those produced by Lipiodol, except that they were of much shorter duration and almost completely reversible within three weeks.

Vischer,¹⁸ studying the effects of Ioduron B, found changes more severe and of greater duration, with the occurrence of pneumonitis and granulomas. He attributed these changes to the presence of residual carboxymethyl cellulose.

Zollinger¹⁹ examined 70 surgical specimens of pulmonary tissue. Of these, 25 had bronchography performed with Ioduron B, and 45 had not had a bronchogram made. He points out that the stain used by Vischer to identify carboxymethyl cellulose, toluidine blue, does not differentiate this substance from ordinary mucin. Zollinger used the periodic acid Schiff stain, which stains mucin, but does not stain carboxymethyl cellulose. He concludes that the lesions described by Vischer do not represent reactions to instilled material, but rather that they are mucin granulomas found in both bronchographic and non-bronchographic lungs.

PREVENTION OF SEVERE REACTIONS

The prevention of severe reactions depends on good clinical judgment, careful evaluation of the

individual patient, and skillful avoidance of the major pitfalls of the procedure.

Iodized oils remain satisfactory for months or years when stored under ideal conditions. However, when they begin to deteriorate, the iodine is liberated, coloring the oil brown. The use of brown iodized oil introduces free iodine into the tracheobronchial tree and, thereby, greatly enhances the possibility of a severe reaction. Also, iodized oil should be used at room temperature, since warming reduces its viscosity and may lead to alveolar flooding. A 5-lobe bronchogram can be made satisfactorily with 20 to 30 cc. of contrast medium.

A careful history of prior reactions to local anesthetics, allergies, and asthma should be taken.

Bronchography should be performed on an empty stomach. The patient should be adequately, but not excessively, sedated so that he can cooperate with postural drainage after the bronchograms are made. Most of the iodized oil and the viscosifying agent in the aqueous preparations are removed by way of the tracheobronchial tree. This removal is greatly facilitated by postural drainage. Gentle coughing may further assist removal of the contrast medium, but excessive coughing promotes alveolar filling and retention.

Since the more severe and delayed iodine reactions are due to absorption of iodine set free by the digestion of swallowed oil, bronchography should be followed by purgation with a saline cathartic, such as magnesium sulfate.

SUMMARY

The steps to take in preparing a patient for bronchography and the procedure to follow until the final bronchogram has been made have been presented. The dangers, complications, and a review of the literature on each phase have been discussed.

In conclusion, the following points are worthy of special attention:

1. Inflammatory lesions of the lung and bronchial tree should receive maximum treatment before bronchography to insure adequate filling of the bronchi, increase the effectiveness of local anesthesia, and decrease the possibility of infection.

2. Postural drainage should be carried out prior to bronchography to remove retained secretions from the tracheobronchial tree.

3. Adequate premedication is essential to decrease the toxic potential of the anesthetic, decrease bronchial secretions, and depress the cough reflex.

4. Overmedication should be avoided, since it depresses respiration, abolishes the cough reflex, and renders the patient unable to cooperate during and after the procedure.

5. The smallest amount of anesthetic that will produce adequate anesthesia should be used. In over 90 per cent of anesthetic accidents, the safe dosage has been exceeded. Cocaine has produced severe reactions with 20 mg., although 1.2 gm. is ordinarily considered the fatal dose. The manufacturer of Pontocaine states that not more than 20 mg. of the drug should be used in endoscopy.

6. The iodized oils used as contrast media are slowly absorbed and may obscure lesions in chest roentgenograms for months or years. Furthermore, they may produce iodism when swallowed and have the additional disadvantage of not permitting early repetition of bronchograms.

7. The water-soluble contrast media are hypertonic solutions which produce bronchial irritation and severe coughing. These reactions can be avoided by adequate anesthesia.

8. The water-soluble preparations have the advantages of rapid absorption, not obscuring future chest roentgenograms, permitting early repetition of bronchograms, and not producing iodism.

9. Segmental bronchi in all lobes of both lungs can be adequately filled with 20 to 30 cc. of contrast medium.

10. The vast majority of reactions to the contrast medium occur when the bronchial tree becomes flooded.

11. The iodized oils fill the bronchial lumen; whereas, the water-soluble compounds outline the walls of the bronchial tree.

12. Comprehensive knowledge of the segmental anatomy of the lungs and tracheobronchial tree is essential to obtain the best results.

13. Bronchography is absolutely contraindicated in cases of pronounced impairment of cardiovascular or pulmonary functions and in tuberculosis that is not under adequate control.

14. Asthma, allergies, or drug sensitivities are relative contraindications and must be evaluated individually.

15. Prompt and adequate postural drainage after bronchography aids in removing the contrast medium and reduces the incidence of reactions.

16. When iodized oil is used, the study should be followed by purgation with a saline cathartic, such as $MgSO_4$ to remove the contrast medium from the gastrointestinal tract and prevent iodism.

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Atherosclerosis and Coronary Heart Disease

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ATHEROSCLEROSIS is a distinct entity; arteriosclerosis is a generic term embracing several different lesions. Of the several entities in the latter group, atherosclerosis is by far the most important underlying cause of human morbidity and mortality. Thus, it is responsible for at least 90 per cent of myocardial infarctions and acute coronary deaths today. Therefore, the vigorous research assault against atherosclerosis in recent years is quite appropriate.

Any investigator attempting research on a problem must have a theoretic framework of reference. Most people working on atherosclerosis today agree with the over-all concept that atherosclerosis is not part of senescence but is a disease and, specifically, a disease intimately related to alterations in cholesterol-lipid-lipoprotein metabolism. It is not inevitable; it is reversible, curable, and preventable.

The cholesterol-lipid-lipoprotein concept of atherogenesis is erected upon such firm pillars of knowledge that it can rightly be designated a theory. Therefore, the subject can be developed by examining these pillars of information.

In attacking a disease like atherosclerosis, 3 main avenues of approach are available. The first is clinical investigation, the study of the disease in its human victims. The second is laboratory investigation, which attacks the problem through work on experimental animals. The third is epidemiologic research, which involves the study of disease in population groups in order to ascertain how disease varies in time, space, and among different strata of the population of a given country. Properly pursued, epidemiologic research aims not only to study these varia-

tions but also to disclose factors which account for these variations, such as economic, cultural, dietary, occupational, ethnic, and genetic.

EPIDEMIOLOGIC INVESTIGATION

The epidemiologic assault on atherosclerosis in the last few years has been highly fruitful. By the way, this chapter in atherosclerosis research goes back many years. As long ago as 1934,¹ on the basis of 28 reports in the literature, the following conclusions could be drawn concerning atherosclerosis: "... In no race for which a high cholesterol intake (in the form of eggs, butter, and milk) and fat intake are recorded is atherosclerosis absent. . . . Where a high protein diet is consumed, which naturally contains small quantities of cholesterol, but where the neutral fat intake is low, atherosclerosis is not prevalent."

In recent years, the epidemiologic assault has included studies on Ceylonese, Okinawans, Japanese, South Africans, Guatemalans, Costa Ricans, Dutch, English, Italians, Spaniards, and so forth. In Britain, Italy and Spain, comparisons have been made of different socioeconomic, occupation, and income groups. It has been verified that pronounced differences exist among different population groups in the incidence of clinical morbidity and mortality due to atherosclerosis. Furthermore, these differences have been found to be related to differences in life span patterns of diet, particularly differences in the level of calorie-cholesterol-lipid intake. Finally, a third correlation has been made among diet, plasma lipid pattern, and atherosclerosis. Thus, the commonly accepted standards for normal plasma cholesterol concentration in the United States turn out to be rather high when compared to values obtained for such groups as the English, Italians, Spaniards, South Africans, Guatemalans, and Japanese. Moreover, the

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Based on a lecture given at a postgraduate conference on Diseases of the Heart, Lungs, and Blood Vessels at the State University of Iowa, College of Medicine, Iowa City, March 23, 1956.

pattern of change in plasma cholesterol levels with age also differs among different peoples under the influence of different diets. Thus, in middle-class Americans, plasma cholesterol levels tend to rise with each decade of life—a pattern absent in the Bantu of South Africa or the poorer classes of Italy or Spain but present in the wealthier classes in Italy and Spain, who eat a diet rich in calories, cholesterol, and lipid very similar to ours.

A valid conclusion, based on extensive accumulated data, is that a general correlation has been demonstrated among calorie-cholesterol-lipid intake, plasma cholesterol-lipid-lipoprotein levels, and atherosclerosis. Parenthetically, it might be added that this induction is confirmed by experience during World War II, when, due to the deprivations brought to Europe, there was a mass deterioration in diet, particularly in intake of total calories and lipids. That pronounced, imposed change of diet was shortly followed by a significant decline in death rates caused by arteriosclerotic and degenerative heart disease.

At first thought, it may seem strange to many of us that our American diet may not be as "perfect" as we like to think it is. Do we know what an optimum diet for optimum health throughout an optimum life span is? The answer must be a categorical "No." The science of nutrition is a young science that has rightly addressed itself to the prime problem of undernutrition. This study has successfully defined the dietary essentials and thereby given us the knowledge to combat acute famine, chronic semistarvation, avitaminoses, protein deficiencies, and so forth. This focus of attack has been fully sound, since the main problem for a majority of humanity was and is not malnutrition in the form of overnutrition, but malnutrition in the form of undernutrition, acute or chronic, gross or borderline.

Undernutrition is the problem today in many countries of the world, as can be readily seen by a perusal of the Statistical Yearbook of the United Nations. In countries like Burma, India, Japan, Indochina, Colombia, Venezuela, Honduras, Brazil, Chile, Egypt, Rhodesia, caloric intake per person per day averages less than 2,400 calories. India is the lowest with a 1,600 caloric intake, whereas the United States consumes 3,200 calories! In the economically underdeveloped countries, less than 20 per cent of calories are of animal origin—in India, 7 per cent; in Japan, 4 per cent; but in the United States, 41 per cent. In these countries, only 1 to 6 kg. of fats and oils are consumed per person per annum compared to 20 kg. in the United States. Less than 20 per

cent of total calories are derived from fat as against 40 to 45 per cent in the United States. Among American business and professional men, 58 per cent is from fat. Milk intake is a fraction of ours—in Egypt, 25 kg. per person per year; Chile, 68; Burma, 8; India, 46; Japan, 6; and America, 253 kg. per year.

Since most of these countries are plagued by poverty, hunger, squalor, illiteracy, ignorance, and inadequate public health services, no wonder infant mortality rates and death rates due to tuberculosis, pneumonias, influenza, dysenteries, and infestations are appallingly high. These diseases are the main debilitators and killers and, therefore, the chief public health problems throughout Asia, Africa, and Latin America. Throughout these continents, life expectancy tends to be less than 35 years. Under these circumstances, it is not surprising that the "degenerative" diseases, particularly arteriosclerotic and hypertensive cardiovascular disease, are not major public health problems. The reason, of course, is that the socioeconomic preconditions do not exist for their emergence on a large scale in contrast to the United States and other economically developed countries where, in recent decades, the so-called "degenerative" diseases have replaced epidemic diseases and undernutrition as the decisive public health problems. As is obvious from the vital statistics data of the economically underdeveloped countries, their apparent relative freedom from atherosclerosis cannot be justifiably utilized as an apology for chronic undernutrition.

As already indicated, epidemiologic methods are applicable not only for comparing different countries, but also for analyzing differences in prevalence of disease among specific groups within a given country. One of us (J. S.), with the cooperation of Dr. Herman N. Bundesen, president of the Chicago Board of Health, initiated such an investigation of mortality trends in Chicago due to the several major cardiovascular-renal diseases. Analysis of 1,953 Chicago deaths in specific age, race, sex, occupation, and income groups suggested significant group differences in incidence. With respect to arteriosclerotic heart disease, for example, the data again confirmed that men aged 25 to 64 have a considerably higher age-specific death rate than women. The preliminary data further suggested that this relative immunity of women to coronary disease was greater in white than in Negro women of the same age. Middle-aged Negro males in Chicago apparently tend to have age-specific coronary death rates as high or higher than white males. Furthermore, white males

from census tracts in Chicago with the lowest median income seemed to have considerably higher age-specific death rates than middle-aged white males from higher income census tracts. Finally, laborers seemed to have as high coronary death rates as males of the same age and race in other occupation groups. Contrary to prevalent notions, the professional-executive-managerial group seemed to have age-race-sex specific death rates no higher than manual workers.

It must be emphasized that these findings are preliminary. Delineation of mortality trends, based on death certificate data, is fraught with difficulties and pitfalls. The tentative nature of these trends must be stressed, as well as the need for great caution in drawing conclusions. Much additional work must be done before anything definitive is in hand.

Noting these stringent qualifications, it is nonetheless intriguing to speculate about the meaning of some of the foregoing apparent trends. Why is it, for example, that the poor in countries like Spain and Italy have very low coronary disease death rates, whereas the poor laborers in Chicago apparently have very high age-specific rates? Are these apparently contradictory trends, assuming their validity for the moment, inconsistent with the basic thesis of the key relationship between diet and coronary atherosclerosis? Probably not, for even a perfunctory perusal of the available literature reveals that dietary patterns of the poor in America are very different from those of poor people anywhere else in the world. Starchy foods, grains and/or potatoes are the chief subsistence rations of poor people in all countries of the world except the United States. This is clearly revealed by the United Nations data on diet in Italy, for example: 2,480 calories per person per day, 16 per cent of animal origin (United States: 3,160 and 41 per cent, respectively); 90 kg. per person per year of milk and 16 kg. of meat (United States: 253 and 76, respectively); 11 kg. per person per year of fats and oils, equal to about 20 per cent of total calories (United States: 20 kg. and 41 per cent, respectively); 13 kg. per person per year of refined sugar (United States: 42); 153 kg. per person per year of cereals (United States: 75). These are national averages for all Italians. For poor Italians, meat, milk, fats, oils, sugar are in still shorter supply; cereals predominate even more as the decisive dietary constituents. The pattern of diet of the poor in America is entirely different. As many dietary surveys have revealed, low income urban families in the United States tend to eat a diet as

high in calories, starches, refined sugars, fats, and oils as high income families. However, the poor ingest significantly less fruit, vegetables, milk, eggs, meats, poultry, and fish. Hence, it is oversimplified and inaccurate to characterize the present-day American diet as a "luxus" diet, particularly if speaking of the poor in America. By National Research Council standards, the diet of the American poor tends frequently to be substandard and deficient in several essential nutrients, including certain amino acids, minerals, and vitamins. The "luxus" items in the American diet may further aggravate the tendency to deficiencies, since experimental findings in animals indicate that requirements for many essential nutrients increase as intakes of calories, carbohydrates, and fats mount. As Babcock and associates² recently noted in their report on "Nutritional Status of Industrial Workers," "Although the men consumed relatively large amounts of meat and enriched bread, their high consumption of unenriched bread and pastries, sweetened beverages, and candy bars probably explains the low thiamine values. The low ascorbic acid intakes frequently observed were ascribed to low consumption of citrus fruits and tomatoes."

Therefore, the dietary problem in the United States today seems more correctly characterized as one of dietary imbalance. The questions compellingly present are: Is this modern dietary aberration wreaking havoc with the cardiovascular-renal systems of Americans? Is this a key factor in the high toll coronary disease is apparently taking among middle-aged poor laboring Chicagoans, Negroes, and whites?

Further detailed epidemiologic, clinical, and laboratory research is essential to clarify these problems. This new concept of the role of dietary imbalance — which calls attention not only to the excess ingestion of calories, fats, and cholesterol in atherogenesis, but also to the absolute or relative inadequacy of certain nutrients (vitamins, minerals, essential fatty acids and amino acids) — is clearly an hypothesis, since it does not yet rest on a firmly proved, comprehensive foundation of facts. By putting such a concept forward, we call attention to a key area for further research and we highlight the conclusion that at its present stage of development the science of nutrition does not have a clearcut answer to the problem of optimum diet for optimum health during an optimum life span.

This conclusion is reenforced if we look at this problem of the epidemiology of atherosclerosis from an historic point of view. In the time scale of human evolution, the diet we are accustomed to today is a relatively recent acquisition.

Until recently man was exclusively a food gatherer. As such, he knew nothing of cereals, fermented bread, beer, dairy foods, edible oils, spices, and savoring agents. It was literally impossible for most primitive food gatherers to do as we Americans do, that is, to ingest 40 to 45 per cent of their calories in the form of lipid. They certainly could not ingest 58 per cent of their calories as lipids—the average estimated lipid intake of business and professional men in the United States today.

About eight thousand years ago in the Fertile Crescent of the Middle East, man made the decisive historic change from food gathering to food producing and became a farmer and a herder, thereby creating the economic pre-conditions both for civilization (urban life) and for the kind of diet we Americans are used to today. As Dr. Henry Sigerist has shown in Volume I of his "History of Medicine," the upper classes of ancient Egypt, the priesthood and the nobility, did consume a diet very similar to ours, and their mummies, passed down to us with bits of aorta still preserved in situ, reveal the existence of atherosclerosis. Thus, the most ancient evidence of atherosclerosis is found in people who ate a diet similar to ours. Although this "luxus" diet became potentially available with the transition to a food producing economy, it was not actually available to the great majority of mankind. In ancient Egypt, for example, the urban and rural masses existed on a bread-and-beer staple diet very different from that of the "elite." A similar situation has prevailed for most of humanity right down to the present time. It is, therefore, not merely accidental that the epidemiologic pattern of atherosclerosis varies significantly from country to country and also within different socioeconomic groups in a given country.

Atherosclerosis is not simply a dietary disease. Such an oversimplified thesis is not difficult to refute. For example, any one could say, "I know an old fellow who has been eating a lipid-laden American diet for eighty years. He is as healthy as can be. He has no coronary disease, at least, clinically. So where does diet fit in?" An even more telling argument is that in the middle decades of life, the female sex is remarkably immune to coronary disease compared with the male. For every woman who dies of coronary disease prior to the age of 50, some 5 to 20 men die. Perhaps the dietary habits of American women and men are somewhat different. However, this scarcely accounts for the remarkable immunity of premenopausal women to coronary atherosclerosis. On the contrary, there is good

reason to believe that the endocrines exert a decisive influence.

The problem of the relationship between diet and atherogenesis can be formulated along the following lines: A definite life-span pattern of diet is a prerequisite for a high incidence of atherosclerosis in a population. If a diet is high in calories, carbohydrates, salt, cholesterol, and lipids (particularly saturated fats) and possibly low in certain amino acids, minerals, essential fatty acids, and vitamins, a high percentage of that population will be victims of this disease. Population groups subsisting on a diet low in calories, cholesterol, and lipids will be relatively immune to this disease. Atherosclerosis may or may not develop in individuals accustomed to a high calorie-cholesterol-lipid diet. Several other factors are involved, such as sex endocrinology, the hereditary metabolic pattern, and the type of work performed. Recent data from Britain indicate that sedentary workers are victims more often than active workers, suggesting that large muscle activity may be antiatherogenic.

CLINICAL INVESTIGATION

The second pillar of the cholesterol-lipid-lipoprotein concept of atherogenesis arises from clinical medicine. This is a structure erected over the last one hundred years, since the first pathologic anatomists of the Virchowian school recognized atherosclerosis as a distinct pathologic entity. They distinguished it from the other arterial thickenings based on the recognition of its hallmark, the lipid-laden, cholesterol-laden, atherosclerotic plaque. This morphologic evidence suggested, but never proved, that cholesterol-lipid might be a key factor in the pathogenesis of the lesion. More recent were the splendid pathologic studies by Dr. Timothy Leary in Boston, who showed that the first stage of the atherosclerotic process in man was the foam lipophage cell, consisting of one or more layers of cholesterol-lipid-laden cells in the intima. Animal experiments have confirmed the fact that this is the beginning of the disease.

The hypothesis of the key role of lipids in atherogenesis was further supported by work of biochemists who began to analyze chemically the vessel walls. They confirmed the morphologic impression that there was more lipid in atherosclerotic vessels. They also showed that in young lesions the ratios among the lipids—ratio of free to esterified cholesterol, of cholesterol to phospholipid, and so forth—were the same as in plasma, suggesting that the source of lipids in atherosclerotic vessels might be the lipoproteins of plasma.

Early clinical experiments showed that in several distinct disease entities, apparently with nothing in common except a derangement of lipid metabolism manifesting itself in chronic hypercholesteremic hyperlipemia, atherosclerosis occurs prematurely and with increased frequency and severity. These diseases include nephrosis, xanthomatosis, hypothyroidism, and diabetes mellitus. This clinical generalization further supports the concept that atherosclerosis is basically a metabolic disease, that is, a disease fundamentally resulting from deranged cholesterol-lipid-lipoprotein metabolism. But these clinical observations did not solve the decisive problem of the pathogenesis of the ordinary, frequent, "garden variety" type of coronary case, occurring in an otherwise healthy person, without diabetes, gross xanthomatosis, nephrosis, or hypothyroidism. What about the pathogenesis of such atherosclerosis? For years this problem has been the focal point of contention with respect to the cholesterol-lipid-lipoprotein concept of atherogenesis. And all the answers are not yet in by any means. However, recent studies definitely show that a group of middle-aged patients with clinical atherosclerosis, compared with a clinically normal group, invariably exhibit higher mean plasma cholesterol levels, higher plasma cholesterol-phospholipid ratios, and higher levels of plasma cholesterol-bearing beta-lipoprotein molecules. These phenomena are demonstrable despite the fact that in a country like our own, the clinically "normal" group actually has a good deal of subclinical atherosclerosis and despite the fact that our clinically accepted "normal" range for plasma cholesterol in the United States probably includes abnormally high values, frequently recorded in healthy Americans because so many of us chronically ingest too many calories-cholesterol-lipids.

Despite these difficulties in finding a really clinically normal group in our population, the coronary disease group, which does have more atherosclerosis than the "normals," also has higher lipid values. And, if we compare these values with the Japanese, South African Bantu, poor Italians, or Spaniards, the differences are very gross.

These are group differences. The problem remains of the considerable overlap in plasma lipid levels between individuals in our American normal group versus the coronary group. What about people in the coronary group (less than 10 per cent of middle-aged patients) who have low normal lipid levels. That question awaits a final answer. It brings us to the borderline of present-day research knowledge. This cru-

cial problem stimulated the recent research into the question of the mode of existence of cholesterol in biologic media such as plasma. Cholesterol was recognized to be a water-insoluble "hydrophobic" material. It is incapable of simple solution in a water medium. Its mode of existence in biologic systems, extracellularly or intracellularly, is by virtue of colloidal solution in complex colloidal micelles, lipoprotein molecules composed of cholesterol, phospholipids, neutral fats, and protein. Therefore, it was reasoned that the atherosclerosis problem might be clarified if cholesterol were studied in its naturally occurring form, as lipoprotein, and not simply as plasma total (or free and esterified) cholesterol extracted from plasma by vigorous analytic procedures which totally disrupted the lipoprotein molecule. This was not a simple problem. Special physical chemical and biochemical methods were needed for analysis of intact cholesterol-lipid-lipoprotein molecules — ultracentrifugal and electrophoretic methods, the Cohn chemical precipitation technics for protein fractionation, and so forth. At the present time, an intensive assault on the atherosclerosis problem is utilizing these newer methods. The current status of this rapidly developing field is impossible to review in this paper. Suffice it to state that with the many new leads bearing directly upon the atherosclerosis problem our basic knowledge of cholesterol-lipid-lipoprotein metabolism is being extensively enlarged and revised.

LABORATORY INVESTIGATION

The third basic point of assault against this disease is in the laboratory. In order to appreciate the status of basic laboratory research on atherosclerosis, it is important to note that experimental atherosclerosis has a history and a prehistory, with the year 1908 as the dividing line. Until 1908, many methods had been tried to produce the lesion of human atherosclerosis in laboratory animals. All sorts of arterial lesions were produced except atherosclerosis.

The first success was attained by Anitschkow, Ignatowski, and Chalutow in 1908 to 1913. The point of departure apparently was the desire to investigate the changes in metabolism and renal function induced in herbivores by ingestion of animal proteins. In Anitschkow's³ words, "In the course of the experiments, Ignatowski made the observation that some of his experimental animals exhibited pronounced aortic changes, consisting of thickening of the intima, associated with the formation of large cells, which resembled those observed in human atherosclerosis. Ignatowski attributed these changes to the in-

jurious effects of the animal protein on the arterial wall; but he neither gave a detailed morphologic description of them nor attempted an analysis of their origin and development . . . I succeeded in collaboration with Chalatow in producing the typical picture of rabbit atherosclerosis by feeding with pure cholesterol dissolved in vegetable oil. In this way was achieved the experimental demonstration of the important part which this substance plays in the pathogenesis of atherosclerosis."

This discovery stimulated a spurt of research activity which persisted for about twenty years, resulting in many important achievements. Nonetheless, the 1930's witnessed a widespread skepticism and pessimism for several reasons. First, because attempts to reproduce experimental cholesterol atherosclerosis in other animal species were unsuccessful except in the guinea pig.

Second, since the rabbit is an herbivore and, in view of the difficulties with omnivorous and carnivorous species, it was thought that perhaps work in the rabbit was a false lead. Although stemming phylogenetically from a herbivorous line, man is an omnivore.

It was further noted that pronounced hypercholesterolemia and organ cholesterosis tended to develop in rabbits fed cholesterol. Xanthomata developed in tendons and skin. As we know, such is not the case in most atherosclerotic human beings and is only exceptionally seen in severe xanthomatosis. These difficulties, coupled with the fact that money for research was short in the depression-ridden 1930's, led to a considerable decline in research.

Against this background, around 1940, Deborah V. Dauber and one of us (L. N. K.) began to re-explore this problem in other species. We consciously selected the omnivorous domestic fowl, basing our choice on the work done by Fox (in the Philadelphia zoo) on spontaneous avian arteriosclerosis and on a few brief reports in the Japanese literature indicating that chickens might be susceptible to cholesterol-induced atherosclerosis.

We showed that atherosclerosis could be produced in the chick by cholesterol feeding. Moreover, subsequent studies pursued by the present authors demonstrated that this species lent itself particularly well to quantitative studies of the atherogenic process, of such variables as per cent and amount of dietary cholesterol, duration of cholesterol feeding, degree of hypercholesterolemia, chick age and sex, and incidence and severity of lesions. Next, the decisive problem of the influence of various procedures on the ath-

erogenic process could be undertaken. Space does not permit a review of the many such experiments performed in recent years. Before discussing one or two, it should be emphasized that the aforementioned objections raised against experimental work in rabbits no longer exist.

Atherosclerosis has been consistently produced in each of the major laboratory species. In the dog, this condition has been developed by a combination of cholesterol-lipid feeding and induced hypothyroidism; in the monkey and the rat, by a combination of cholesterol-lipid feeding and a diet deficient in sulfhydryl-containing amino acids; in the chick and the rabbit, by cholesterol feeding alone. The important fact is that in all cases the prerequisite for atherogenesis is a derangement in lipid metabolism adequate to produce a sustained hypercholesterolemic hyperlipemia.

Special attention should be called to the experimental procedure required to break down the resistance of monkeys and rats to cholesterol-induced atherogenesis. Induced dietary imbalance was necessary to do so—luxus of fat and cholesterol combined with a deficiency of sulfhydryl-containing amino acids. These findings, together with other related observations in rats and chicks, support the aforementioned hypothesis of the role of dietary imbalance in human atherogenesis.

Furthermore, small quantities of cholesterol fed to the chick and rabbit for long periods of time can produce a minimum hypercholesterolemia, without organ, skin, or tendon cholesterosis; yet, lesions develop in the aorta and coronary vessels. This is a pattern quite similar to that seen in most human beings. Thus, the last few years have seen a positive solution to the principal problems posed in the 1930's with respect to rabbit experiments, with a resultant reaffirmation and strengthening of the cholesterol-lipid-lipoprotein concept of atherogenesis.

Returning to the factors influencing experimental cholesterol-induced atherogenesis, in general, the two main approaches have been an analysis of dietary and hormonal factors.

A few of the results from studies with dietary factors may be summarized briefly. First, a few words about lipotropic factors, choline, inositol, B₁₂, folic acid, various pancreatic preparations, and lecithins. These materials are very important and have profound biologic effects. They are all in one way or another capable of influencing lipid metabolism. However, in no carefully controlled experiment has any lipotropic factor supplementation ever been shown to be capable of significantly mobilizing lipid from a

cholesterol-type fatty liver, lowering blood cholesterol levels, or preventing or curing clinical or experimental atherosclerosis. In view of the many negative experiments, there seems to be no scientific basis at present for telling well-nourished patients to supplement a well-balanced diet with lipotropic factors to combat atherogenesis.

Two other types of dietary experiments have been a little more positive. One concerns the relationship between neutral fat and cholesterol in the diet. In the absence of neutral fat in the diet, cholesterol ingestion does not lead to hypercholesterolemia or atherosclerosis. Of course, this is a highly artificial situation. A combination of high cholesterol and low neutral fat is impossible to obtain except in a synthetic diet. That is a laboratory-created situation, the outcome of which supports the idea that in a diet containing cholesterol and neutral fat, the neutral fat content may be one key factor influencing the resultant plasma cholesterol level. Preliminary results suggest that animal fats do not have a different atherogenic potential than vegetable fats. However, data on this point and on the influence of the essential fatty acids are conflicting. Further studies are needed on man and animals and are in progress at this time.

Another set of dietary experiments concerns plant sterols. When cholesterol is ingested with plant sterols or with other sterols having a structure similar to that of cholesterol, the cholesterol apparently escapes absorption, hypercholesterolemia does not occur, and lesions are prevented. Evidence suggests that the same effect can be accomplished in man. This field is actively under investigation for its obvious possible therapeutic significance.

Further, recent experiments in our laboratory demonstrated that hypercholesterolemia and atherogenesis, usually occurring in chicks fed cholesterol-fat supplemented mash, were suppressed when a high level of proteins and vitamins were ingested. This finding lends further support to the imbalance concept and needs to be followed up in man.

A host of endogenous factors have also been studied, including the effects of hypertension, thyroid hormone, heparin, insulin, diabetes mellitus, and adrenal steroids. Space permits discussion of only the very significant problem of sex steroids.

As already indicated, one of the most intriguing problems in atherosclerosis is the relative immunity of women, particularly before the menopause, to this condition. Obviously, the sex steroids might be expected to be a cause of this

phenomenon. This problem has been tackled experimentally in our laboratory in the last several years. In brief, it was shown that when cholesterol-fed chicks are simultaneously given estrogens, coronary atherosclerosis is completely inhibited, although aorta atherosclerosis proceeds unaffected. The development of a technic for evaluating coronary atherosclerosis was the prime responsibility of one of us (R. P.). This phenomenon is extremely important because it coincides with certain data in man and indicates that different laws govern atherogenesis in different vascular beds, demonstrating that the investigator cannot be satisfied with merely studying the aorta. In view of this phenomenon of segmental atherogenesis, several arterial beds must be examined.

A subsequent experiment explored the therapeutic value of estrogens in cholesterol-fed chicks. When cholesterol was fed for several weeks, coronary lesions were produced in 100 per cent of birds. With continued feeding of the atherogenic diet and concomitant introduction of estrogens, the previously induced lesions were completely reversed. Both the fibroblastic and lipid components of the lesions disappeared completely. Thus atherosclerosis was again demonstrated to be a reversible process.

Up to the present, estrogens have not proved beneficial in one mammalian species, the rabbit. However, Moskowitz, Wissler, et al., have recently shown that estrogens in the rat have an effect on atherogenesis similar to that reported by us in the chicken.

All of these experiments were done in cockerels, immature growing male chicks, utilizing dosages of exogenous estrogen that might be regarded as pharmacologic. Hence, further studies were undertaken to determine the effects of the endogenous physiologic estrogen secretion of the egg-producing hen and to compare the susceptibility of sexually mature male and female chickens to cholesterol-induced aorta and coronary atherogenesis. Mature cholesterol-fed hens were found to exhibit a plasma lipid pattern identical to that induced in cockerels by exogenous estrogens. Furthermore, like estrogen-treated cockerels, the hens were remarkably immune to coronary, but not to aortic, atherosclerosis. In contrast, extensive lesions in both the coronary vessels and aorta developed in cholesterol-fed roosters lacking a supply of estrogen. Thus, sexually mature chickens, unlike immature or castrated birds but like sexually mature human beings, exhibited a significant sex differential in susceptibility to coronary atherogenesis. This antiatherogenic action of estrogens, confined to

the coronary vessels, again demonstrated that atherogenesis proceeds according to different laws in the different arterial beds.

This immunity of estrogen-secreting, egg-producing hens to coronary atherogenesis was not due to mobilization and disposal of cholesterol and lipid via egg-laying, since it was also present in oviduct-ligated hens in which yolks were deposited into the peritoneal cavity and subsequently reabsorbed. This freedom from coronary lesions is undoubtedly a consequence of the endogenous physiologic estrogen secretion of the egg-producing hen. It disappears in castrated hens. The sex difference in susceptibility to coronary atherogenesis in mature chickens remarkably paralleled observations in human beings and supported the concept that estrogens are decisively responsible for the relative immunity of premenopausal women to coronary disease.

Studies were then undertaken to determine what might interfere with this estrogen effect. Simultaneous administration of androgen in quantities adequate to maintain secondary sex characteristics of roosters did not reverse the estrogen antiatherogenesis, nor did pancreatectomy, glyccorticoid diabetes, DCA, or cortisone administration. In fact, the estrogens also completely inhibited the usual DCA- and cortisone-induced hypertension in cockerels.

To date, only two procedures have effectively inhibited this estrogen protection of the coronary vessels against cholesterol-induced atherogenesis. One is the production of hypothyroidism by thiouracil administration. Incidentally, cockerels fed cholesterol and treated with thiouracil and estrogens not only had coronary lesions but also exhibited gross hemorrhages into aortic intimal plaques, a rare phenomenon in experimental—in contrast to human—atherosclerosis. These findings support other experimental and clinical observations on the relationship of thyroid functional status to the maintenance or disruption of the integrity of the arteries.

In another study, insulin administration was also shown to inhibit the ability of estrogens to protect the coronary arteries against cholesterol-induced atherogenesis. This finding is highly intriguing, particularly in view of the well-known

clinical fact that middle-aged women with diabetes mellitus lose the usual relative immunity of their sex to coronary disease. This experimental result with insulin poses the important problem of the possible role of exogenous insulin, used therapeutically in diabetes mellitus, as a pathogenetic factor in the intensified atherogenesis supervening in both males and females with that disease.

This set of experiments, together with considerable evidence in man that estrogens may be responsible for female immunity to coronary atherosclerosis, led us to begin a long-term clinical "double blind" study three years ago. A large group of males under 50 years of age with a recent proved myocardial infarction are being followed to evaluate the possible efficacy of estrogen therapy. The ultimate criteria for effect of treatment are survival time and recurrence of myocardial infarction. Obviously, a very large series of patients and a long period of time will be required to evaluate this therapeutic regime. We prefer to go slowly and carefully. The results to date are encouraging enough to warrant continuing and expanding the series.

In conclusion, we can say that the last decade of active research on atherosclerosis not only fortifies the cholesterol-lipid-lipoprotein concept of the disease but also the idea that the condition is a disease and not senescence. An optimistic prediction can be made that in the not too distant future this disease will come under control prophylactically and therapeutically.

ACKNOWLEDGMENTS

These investigations were successfully accomplished only by virtue of the excellent cooperation and assistance of the department's research assistants and technicians: C. Bolene-Williams, G. Crowley, W. B. Davis, M. Dudley (deceased), A. Ellis, D. Friedman, P. Johnson, C. Kakita, E. Levinson, M. Michael, and C. Thompson.

This research program was made possible principally by grants-in-aid from the National Heart Institute of the United States Public Health Service, American Heart Association, Chicago Heart Association, Life Insurance Medical Research Fund, Michael Reese Research Foundation, as well as private benefactors. It was also aided by cooperation and assistance from several pharmaceutical houses, including Merck & Co., Inc., Armour Labs., Ayerst, McKenna & Harrison, Ltd., Lederle Labs., Lilly Lab. for Clinical Research, Schering Corp., and The Upjohn Co.

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Infections and Fever of Undetermined Origin

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SPEAKING BROADLY, the 4 types of disease most likely to develop first as fevers without a sufficient number of other clinical signs to enable the physician to localize the pathologic process to any organic system or anatomic site are infections, neoplasms, blood dyscrasias, and hypersensitivity states (including the "collagen-vascular" diseases). Because of the varied criteria employed in selecting patients for study and the arbitrary definitions of fever of undetermined origin, the few published reviews of large series of cases of fever of obscure origin do not contain information that permits a definitive statement about the relative frequency with which these 4 types of disease are responsible for diagnostic problems.¹⁻⁴ It should also be pointed out that, on occasion, many other disorders, such as vascular occlusions, degenerative processes, hepatic cirrhosis, sarcoidosis, and metabolic abnormalities can present as perplexing febrile illnesses.⁵⁻⁸

Of the many causes of fever of undetermined origin, infections can be singled out as being of peculiar significance for the simple reason that, as a class, they are far more likely to be completely curable than the others. Today's potent armamentarium of chemotherapeutic and antibiotic agents led Burnet⁹ to state, "It is not too much to say that at the present time no acute infection occurring in a previously healthy individual will result in his death if he reaches a well-equipped hospital before irreparable damage has been done to his tissues. The only exceptions are the two virus diseases, smallpox and yellow fever, and a rare bacterial disease, melioidosis." While this is a microbiologist's somewhat optimistic view of the effectiveness of modern management of infections, it emphasizes that, from the viewpoint of treatment alone, it has become obligatory for the physician to rule out an infectious process as the basis of any febrile

illness. Specific antimicrobial drugs, far from lessening the importance of proper bacteriologic procedures, have given them a practical importance second to none.

This presentation is an attempt to summarize briefly some of the present knowledge of measures commonly employed to establish the presence of infection and to present some examples of problems that may arise in the management of patients with idiopathic febrile disease.

A "PRACTICAL" SOLUTION?

At first glance, the "practical" solution to this problem might appear to be relatively simple. Why not be sure that every patient with fever of unknown etiology receives a good stiff course of antibiotics? Indeed, this is a common practice in acutely febrile patients. While the mere frequency with which antibiotics are administered certainly cannot support the view that the procedure is proper, it again attests to the increased importance that antimicrobial drugs have given to infections as a cause of fever.

Close examination of this admittedly attractive suggestion of an easy way out, in the light of what has been learned about antibiotics in recent years, indicates that this approach to the problem is dangerously erroneous. Reasons are:

1. Antibiotics and related compounds are no exception to the rule that drugs are potentially dangerous. Indeed, their action offers unusual opportunities for untoward effects to occur.

- a. Hypersensitivity or allergy to antibiotics is increasing. The disorders produced range from mild itching and discomfort to fatal anaphylaxis. More important than these undesirable reactions is the fact that indiscriminate use of these drugs for minor illnesses increases the possibility of sensitization and may impair their usefulness.

- b. As Eagle¹⁰ pointed out, the remarkable thing about penicillin and other "wonder drugs" is not that they are able to kill bacteria, but that they do so without harming the cells of the patient. Although penicillin, the first antibiotic to come into general use, is virtually nontoxic, well-nigh the perfect drug from this point of view, the same cannot be said for streptomycin.

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cin and the succession of other agents that have become available during the past decade. Direct toxic effects on the eighth nerve, the kidney, the bone marrow, and so forth are limiting factors in the dosage of several antibiotics, indicative perhaps of the fact that some metabolic pathways and processes are common to microbial and human cellular function.

c. Another danger of these drugs, still incompletely understood, may be termed biologic. By their action upon nonpathogens, as well as disease-producing bacteria, antibiotics can lead to serious imbalance in the microflora of the body. The results range from mild disturbances, such as the disappearance of urobilinogen from the urine when a tetracycline derivative is given, to serious "superinfections" caused by unusual or antibiotic-resistant microorganisms.

The conclusions to be drawn from this brief summary of the harmful reactions that antibiotics can produce are the principles that should govern the use of any potent drug. These agents are not to be prescribed indiscriminately, and their administration should be preceded by careful consideration of the indications for their use.

2. Theoretically, in the early days of the "age of wonder drugs," a physician could carry out a trial of all antimicrobial drugs. There were only the sulfonamides and penicillin, and if the febrile patient failed to respond to either drug, it could be concluded that whether infectious in origin or not, the illness was at least beyond the reach of specific therapy. This statement, of course, does not pertain to the antimalarials and amebicides that had been available for many years.

Today, more than a dozen antibiotics are in common use and obtainable in almost any quantity. Many have overlapping spectra of antibacterial action. Furthermore, accumulated clinical experience has shown that optimum dosage, schedule of administration, and duration of treatment vary widely for infections of different types. There are also several clear indications for using 2 or more antibiotics in combination. A blind, empirical trial of antibiotics to rule out infection in cases of obscure fever is no longer justified as practical, logical, or useful.

3. Are the foregoing paragraphs to be interpreted as indicating that, in my opinion, antibiotics should not be administered until proof of the presence of infection has been obtained? Is there no rational basis for the use of these potent therapeutic agents outside of the bacteriology laboratory? The answer is emphatically negative. Granted that much remains to be learned about these agents, present knowledge can be utilized to formulate a method for select-

ing antibiotics in clinical practice, including administration to patients with undiagnosed fever.

Kilbourne¹¹ pointed out a few years ago that even in the largest and best-equipped medical centers, the *initiation* of treatment with antibiotics is usually based upon a presumptive diagnosis arrived at by history, physical examination, and a few routine laboratory tests. After the therapeutic regimen is begun, it can be modified when the results of cultures are reported a few days later or in accordance with the patient's subsequent course. This concept of a presumptive diagnosis or clinical impression is not new, of course, but its importance is difficult to overestimate.

4. Of course, it can be said that the situation in a teaching hospital is entirely different from home and office practice. The author admits that the situations may differ but that the principles previously outlined are no less applicable and are probably even more important. Let us turn attention to 3 common situations. Each of the examples chosen is more likely to arise in home or office practice than in hospitals, and each accounts for an appreciable portion of the annual expenditure for sulfonamides and antibiotics.

a. *Respiratory disease.* During the fall and winter months, respiratory infections, the vast majority of which are of viral origin, consume much of the practitioner's attention. With rare exceptions, such conditions are easily recognized as viral diseases and, hence, are unaffected by any known drug. The physician who gives penicillin, a tetracycline, or a sulfonamide to these patients does so, not because he is unaware of the fact that these agents possess no antiviral action but because he feels that something must be prescribed and, by doing so, he hopes to prevent the development of a complicating bacterial infection. Bacterial complications of acute viral respiratory infections are not common. If the secondary bacterial complications *known* to occur in such situations are considered, the increased incidence of staphylococcal pneumonia after epidemic influenza¹² can be cited and the occurrence of hemophilus infection of the trachea, bronchi, and lung in children. What can be expected of antibiotics given "prophylactically"? The staphylococcus probably surpasses all other pathogenic bacteria in its ability to circumvent the action of antibiotics. Rather than reducing the incidence of staphylococcal pneumonia after influenza, the prophylactic administration of penicillin is more apt to produce the complication by a bacterial strain that is resistant to the action of penicillin. The administration of tetracycline derivatives has been

shown in well-controlled studies to enhance the overgrowth of the flora of the respiratory tract by resistant staphylococci.¹³ Indeed, the study of Jackson and Finland that established the efficacy of Terramycin in controlling pneumococcal pneumonia also showed that an appreciable number of patients, although pneumococci were quickly eradicated, died of superimposed infection by resistant staphylococci.

In children, the use of penicillin, a drug that is ineffective against *Hemophilus influenzae* but very effective in reducing Gram-positive cocci in the flora of the respiratory tract, would be expected to enhance the opportunity for overgrowth by this pathogen. The speculations are borne out by extensive studies of prophylactic administration of antibiotics to patients with viral infections of the respiratory tract reported by Weinstein and associates.¹⁴ Not only was the incidence of secondary bacterial infection higher in patients who received antibiotics than in those who did not, but the complicating infections that arose were due to unusual types of bacteria or antibiotic-resistant strains of common pathogens.

b. *Fever without localizing signs.* Medical practice abounds with acute illnesses of presumed viral origin, characterized by fever, malaise, and few, if any, localizing signs on physical examination. Recovery is spontaneous within a few days. Antibiotics do not influence these grippe-like states but are often given "just in case." Bacterial diseases that might have their onset as fevers without specific signs would include tuberculosis, typhoid, tularemia, and brucellosis. None of these is properly treated by agents that would be likely to be administered empirically. Indeed, in order to be sure of a proper regimen, isoniazid, streptomycin, Chloromycetin, and a tetracycline drug should be given. Also, the diagnostic confusion that administration of an antibiotic can cause should be considered. Suppose, for instance, that diarrhea, acute arthritis, or a petechial eruption develops twenty-four hours after the initiation of treat-

ment. Are such conditions to be interpreted as signs of the underlying disease or as untoward effects of the antibiotic? The use of the wrong drug or the wrong dosage can also suppress signs of infection without being curative, delay proper diagnosis, and prolong the time required to institute proper therapy. Finally, the obvious fact that all fevers are not caused by infection must be mentioned. Lupus erythematosus, rheumatic fever and other collagen diseases, and lymphoma are examples of noninfectious febrile disorders. The logical approach to these problems is clear. In the patient with fever and no localizing signs, the proper procedure is that of watchful waiting. If temperature returns to normal and symptoms abate within a few days, antibiotics are unnecessary. If fever persists and the patient becomes worse, competent laboratory aid should be obtained to establish diagnosis and thus enable the physician to institute proper treatment.

c. *Misleading information.* The third situation arises from the fact that the public has been informed, in glowing terms, about antibiotics. The patient or his family frequently demands one of the "wonder drugs" if fever does not subside promptly. This pressure upon the physician to prescribe antibiotics is often cited as a problem; actually, it is not. A physician with any professional skill and pride rejects such demands.

The logical conclusions to be derived from the foregoing discussion are: first, that a blind therapeutic trial of antibiotics cannot eliminate treatable infection as an etiologic possibility in a patient with fever of undetermined origin; second, in patients with obscure fever, the administration of antibiotics can confuse diagnosis and delay curative therapy. The proper procedure is careful observation coupled with appropriate clinical tests, leading to a clinical impression which can be modified as information about the patient accumulates. This is the only practical solution to the problem of treatable infection as a cause of fever of undetermined origin.

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Public Relations and the College Health Service

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As our society becomes increasingly technical and scientific in its basic organization, the medical profession is presented with an excellent opportunity for service. This possibility stems from the need to preserve a certain kind of balance or integration in the presence of many more opportunities than any one individual can exercise. A recent writer in the *Manchester Guardian* stated that we not only need to add more years to life but to put more life into the years. Herein lies the peculiarly advantageous position of physicians and other health workers. Health has become a central concern in western society in spite of many words and actions on the part of responsible persons which seemed designed to deny that simple fact. Dr. Edward Churchill¹ has said, "The quest for individual survival in this world is fully as intense as the older hope for personal immortality in the next." Whether we like it or not, the medical profession is coming to be more and more in a position of authority. Many people who used to endure their troubles as best they could or try to obtain relief by diversion or escape now consult physicians when they are unhappy or in difficulty. Thus, all medical men should give serious thought to the kinds of impressions they make on their fellows. This is particularly true of the college health service, because it has influence, actual and potential, on a very important group in our society. Such an influence determines in large measure whether or not the students who later become citizens in their own communities will be helpful in the development of better health practices, merely apathetic, or, in some instances, actively opposed to good public health practices.

A college health program may be organized to appear to the students and faculty to be a first-aid and treatment center, which does not impinge on the inner workings of the institution except in definite emergencies. Others may strive

to develop the idea in the minds of all members of the college that health can be maintained only by active and cooperative efforts on the part of all persons in the institution and, to some extent, in the surrounding community as well. The latter philosophy dominates my thinking. This point of view is occasionally bitterly attacked by members of the medical profession who favor no medical attention to the public other than on a fee-for-service basis.

Sometimes I think that, in addition to competence, the chief quality of a college health worker should be patience. It is often difficult to be patient with the small minority of students and faculty members who exhibit undue impatience or excessive irritation when they come to the health center with various complaints. Yet, at the same time, if we, who are trying to be of help to others, can realize that rudeness and bad manners are a sign of unhappiness and insecurity, these manifestations are much easier to understand and endure. Eric Hoffer has said that rudeness is the weak man's imitation of strength. If the staff of a college health service returns such sentiments in kind, public relations suffer. We have a kind of unofficial rule on our service that all bad manners are reserved for use by patients. This somewhat ridiculous way of looking at the problem helps each of us keep a certain objectivity or perspective with regard to the complaining patient or parent.

A large reservoir of sentiment still exists in this country to the effect that college health services are not only inefficient but that there is some real intent to keep them so. On one occasion while I was at Massachusetts Institute of Technology, I had a student who complained about one of my most capable colleagues. Before commenting, I looked at his record at the health service and found that he had not even consulted this particular physician. When I confronted him with this fact later, he said, "Oh, I just picked

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Presented at the thirty-fourth annual meeting of the American College Health Association in Minneapolis, May 17 through 19, 1956.

his name out at random, because I knew if he were working for a college health department, he could not be much good." I had complaints from parents because we gave aspirin to a student and had not put him to bed. They explained that aspirin opens the pores and any one knows that to walk about in the open air with open pores after taking aspirin is a sure way to get pneumonia. Another set of parents objected vigorously because we failed to diagnose their son's illness. The truth was that upon his return home his family physician looked into his throat and said, "He has enlarged tonsils, and that is the cause of his trouble." Actually, the student was recovering from a moderately severe attack of infectious mononucleosis and had had repeated blood counts, a heterophil agglutination test, liver function tests, a flat x-ray plate of his abdomen to determine the size of his spleen, together with appropriate instructions as to how to take care of himself after his short period of hospitalization. All these examinations were cast aside in favor of a chance comment that enlarged tonsils caused his difficulty. Such criticisms must be met with patience and understanding, because resentment only adds to the difficulties.

The face that the college health service turns toward its public is determined to a very considerable extent by the morale of the staff itself. Good morale does not just happen without effort on someone's part, but instead is a quality which can be developed and nurtured. Dissension between any two individuals in a health service, a feeling on the part of some staff member that he is being exploited, that he does not have an important assignment, or a sense of isolation are all conducive to careless work. Not only is good medical service extremely desirable, but cleanliness and pride in the establishment are helpful in creating an impression to the incoming patients that the department is proud of its work and is keenly interested in doing a good job. The inflection of the voices heard on the telephone and the manner in which students and others are directed to the proper physician are of utmost importance. Abrupt refusal of a request without adequate explanation, no matter how unreasonable the request may be, is sure to evoke criticism.

What is the busy college physician who has worked hard all week to do when parents arrive without warning on a Saturday night and announce to him that they want to have a good long talk with him on Sunday morning about their son or daughter? The resolution of problems like these goes a long way toward making good or poor public relations.

This brings to mind the question of whether or not a health service should notify parents every time a student is admitted to the college infirmary. Our custom at Harvard and at Massachusetts Institute of Technology is not to notify them unless the illness is serious or unless the student requests it. This means that at times we have to resist considerable criticism from parents who believe that the college should supervise every detail of their son's activities. The criticism usually disappears when it is explained to them that their feelings are being considered and that they would have been notified had there been any serious complication.

Some physicians and nurses are very much concerned for fear the students will take advantage of them. If a service is conducted on the premise that taking advantage of the doctor must be avoided at all costs, the students soon sense this attitude and make a game of it. If it is assumed that, of course, they will indulge in a bit of "leg-pulling" now and then, these forms of behavior become much easier to handle, and such things are tried much less often. Such behavior is, in itself, of clinical interest. Medical excuse systems lend themselves to such perversions of responsibility.

I believe that a major contribution toward improved public relations with respect to college health services would be accomplished if the medical excuse systems could be abolished entirely. To do this, college officials and faculty members must change their attitudes. Instead of thinking of illness as an excuse for not doing required work, it should be considered a temporary impediment like any other personal emergency. Instead of asking the physician for an excuse, the student should go to the health center and obtain appropriate treatment or advice for his condition, after which he can explain to his instructor any variation from the required time schedule. In the great majority of instances, the student is very fair and truthful in his report to the instructor. Those few instances in which the student tries to magnify or distort his story are of interest to the faculty and should be remembered at the time of promotion from one college class to the next. Someone might logically ask, "What is the difference between a written slip from the physician to be presented to the instructor and a telephone call from the instructor to the health service to find out whether or not a student had been ill?" The psychological difference is great, and the instructor will have to make only an occasional call to the health center. A medical excuse system encourages students to go to the health center for an excuse

very frequently. In addition, if the illness is minor, the student feels obliged to exaggerate his illness in order to be sure an excuse will be forthcoming. In this way, illness is exploited and undesirable attitudes generated.

The way in which the health service staff keeps records has a considerable influence on the attitudes of students and others toward the total health program. Any system which permits patients to see their records is undesirable, although architectural shortcomings in some buildings make enforcement of this concept almost impossible. Physicians who know that patients may examine the records cannot express their true thoughts or opinions.

The use of college health records for screening purposes by graduate schools has brought to our attention a number of very embarrassing questions. All of us want to be fair and helpful to our colleagues in other schools. On the other hand, can we maintain the confidence of our students and be useful to them when they have difficulties of a sensitive, delicate, and intimate nature if they know these records may be used in connection with their application to graduate schools? The fact that their permission is required before the records can be put to such use does not essentially change the fundamental problem. The members of Yale's Department of University Health have been quite concerned about this problem and, as a result, have recently indicated that records will no longer be consulted when physicians are asked to fill out forms for submission to graduate schools or scholarship-granting agencies. The physician associated with the health department will act in the same manner as a physician not so connected, recording findings as determined directly at the time of the interview. We will watch with great interest as the consequences of this policy become evident.

Needless to say, a good relationship between the student's family physician and the college health staff is very desirable. Communications between them help convey to the student a feeling that his health needs are considered uppermost. Quite often, delicate situations arise in connection with some student's illness that require skillful planning and handling on the part of both the family and the college physician or the nurse involved. Likewise, good relationships with local medical societies and groups are quite worthwhile to develop. Members of the college health service can help themselves as well as the community by doing their share of work in the community hospital, teaching in the medical school if there is one, and participating in public health activities. The physician or nurse who

builds a valued place for himself in the community is all the more able to obtain the respect and confidence of students.

A very good way of developing desirable attitudes toward the health service in the college community is by taking student opinion into consideration in various ways. An advisory committee made up of student representatives is most helpful in the development of effective medical policies. If students know the reason for the hours kept by the health service, why certain regulations must be enforced, and what difficulties are involved in communicating with students, public relations are much improved. In the development of insurance plans, students can be of inestimable help as they relay facts and opinions back and forth from student groups to the health center officials. The custom of inviting constructive criticisms at all times and then discussing these criticisms with student representatives has been found to be most helpful in my experience. Likewise, the preparation of brochures on various health problems that affect students is worthwhile.

The relationship of the health service to the college newspaper may be a source of satisfaction or great misunderstanding, depending upon the attitudes of the student staff. In some schools, and, I fear, the majority, the ethics of journalism is interpreted in such a way that excitement and drama take precedence over accuracy and reader satisfaction. James Thurber's comment, "Don't get it right, just get it written," is all too often the apparent guiding principle. Sometimes a rule that all articles must be written by staff members, together with the assumption that if a physician checks for accuracy, censorship is created, prevents dissemination of information of a reliable nature. Many health directors become so discouraged over the disastrous results of publicity that they shun all contacts with the college editors and news writers. Notwithstanding all these difficulties, and I have been grievously sinned against several times, I think a friendly and cooperative relationship between members of the health staff and staff members of the college paper is likely to be beneficial in the long run. Occasionally, a member of the news staff assumes the responsibility of becoming familiar with the public relations aspects of a health service. In such cases, he can be expected to be very helpful.

I should like to emphasize again the point made by President Blanding of Vassar at the Fourth National Conference on Health in Colleges in 1954, that health workers should show by their own activities that they are interested

in all sorts of intellectual activities. Real participation in campus life helps all staff members to know and become known by other college personnel and, thus, reduces our tendency to get into some peripheral position in which we treat our patients but fail to affect the general level of health practices in the college community. Medicine and the allied professions should be as central in the so-called humanities as the studies usually included in that category in the so-called liberal arts colleges. We can obtain the hearing we desire only by utilizing our abilities in furthering intellectual and character development and, thus, strengthen the hands of the college officials in their efforts to develop a college climate in which maturity can be achieved.

Nothing is more frustrating to the persons carrying on a health program than to be taken for granted by the administration and the college in general and then receive inadequate room and finances to perform the necessary functions. A visiting committee consisting of trustees, alumni, and members of one of the health professions can be very helpful in interpreting the needs of the health program to the president and the rest of the trustees. Likewise, an organization of faculty wives designed to keep the infirmary going effectively in times of crisis or epidemics serves to make the needs of a health service more widely known.

REFERENCE

1. CHURCHILL, E. D.: *The Hospital in Contemporary Life*, edited by N. W. Faxon. Cambridge, Massachusetts: Harvard University Press, 1948, p. 36.

Support for an adequate health program must come from the majority of the students, faculty, parents of students, and alumni. Only in deserving widespread support by putting into effect a good program that appeals to the college population in general can the desired interest of these groups be maintained.

Finally, the advantages of a health center centrally located on a college or university campus cannot be overestimated. Even an extra walk of five or ten minutes from the center of an average campus tends to give the impression that the whole health operation is peripheral to education. Furthermore, such a distance prevents students and faculty from going to the clinic for mild illnesses or injuries. A general rule appears to be that the more work is done in the clinics, the less the number of patient-days in the infirmary. I hope this impression, based to some extent on wishful thinking, can be proved sometime in the future. At any rate, any college that builds a new health center and infirmary, which should always be in the same building, in a location far removed from the central college activities is making a serious mistake. If health is a proper concern of educators, it should be a central consideration in all planning, thereby encouraging the idea that good health is desirable to enable students and faculty to learn and teach with a minimum of interference.

CHILDREN born prematurely are, as a group, slightly less intelligent at 8 years of age than are those born at full term.

Handicaps of premature children do not vary with birth weight or length of gestation. However, mental scores tend to be lower among the less premature children, although the tendency is not statistically significant.

Mental disability is significantly greater among children born after an uncomplicated pregnancy than among those whose mothers had toxemia, antepartum hemorrhage, or induction of labor. Among children born after uncomplicated pregnancies, a significant discrepancy exists between those whose parents are small in size or light in weight and those whose parents are tall and heavy; the former group, in which genetic factors may account for low birth weight, are consistently less handicapped than the latter children.

When given reading, vocabulary, and picture intelligence tests, premature children without obvious cerebral damage or birth trauma consistently scored lower than a control group of children matched by sex, social group, ordinal position in the family, mother's age, and degree of crowding in the home. The deficiency was greatest in reading.

J. W. B. DOUGLAS, B.M.: *Brit. M. J.* 4977:1210-1214, 1956.

Planning for Senior Citizens in Minnesota

IN 1951, the legislature created the first Commission on Aging "... to study the problems of the aging population in Minnesota ..." This initial commission was comprised of 5 state senators, 5 state representatives, and 15 citizens.

The 1953 commission, which was also composed of legislators, public administrators, and civic leaders, was created by executive order. Each of these two-year interim bodies was under the chairmanship of retired merchant and rural representative, Teman S. Thompson. Both commissions conducted their operations through committees. Perhaps their greatest contributions lay in helping public, semipublic, eleemosynary, and commercial enterprises become more aware of their opportunities to meet the problems and challenges of aging. It was believed that although much could be achieved through legislation, still greater accomplishments could be gained through the realm of education.

Richard O. Hanson, chairman of the Hennepin County Welfare Board (Minneapolis) and a county commissioner, was asked by Governor Orville L. Freeman to assume the chairmanship of the 1956 Commission on Aging. An impressive array of state leaders accepted the call to serve with Mr. Hanson. The June 6, 1956, report of this advisory body stressed the necessity for planning, stimulating, and coordinating old age activities. Among its recommendations, appropriate staffing was strongly urged to "correlate, integrate, and intensify state departments' services to older people," and to "activate and stimulate statewide programs for older people through appropriate private groups and political subdivisions of the state."

This report emphasized the importance of utilizing existing resources. "The proper use of our state and local resources will be the cornerstone of future developments," continued the Governor in his statement to the press. "Many of the major state departments will be called upon within the next weeks to evaluate their own efforts on behalf of senior citizens, and we eventually anticipate a ten-year blueprint for action."

On July 19, 1956, Governor Freeman announced an intensified effort to develop a statewide program for older citizens, with the appointment of Jerome Kaplan to serve as his special assistant on aging and

as executive secretary of the Minnesota interdepartmental committee on aging.

"This is our second step in solving the old age problem and to take the problem out of old age," the Governor stated. Minnesota is the second state in the United States to make such an appointment—New York created similar posts this past year—and is the first to vest both responsibilities in the same person."

"Plans for the next six months," added the Governor, "include the formation of the interdepartmental committee, a citizens advisory council, county 'town' meetings, and a state conference to be held the latter part of the year. We want to mobilize the thinking and energy of all community and state resources in planning an adequate program to meet economic and special needs of older people. We will, of course, keep our legislators informed of developments and turn to them for advice and counsel."

The Governor outlined 3 basic steps in developing and sustaining old age services: (1) facts about the state community should be learned and delivered to the people of Minnesota, (2) all potential groups should be enlisted in providing the necessary services, and (3) state and local leadership must be available to evolve and maintain gains.

Procedures will be developed to effectively utilize existing state resources, and the special assistant on aging will serve as consultant to state departments on preretirement, counseling programs. The interdepartmental committee on aging will be guided by 2 major purposes: (1) strengthening services to the senior citizens of Minnesota, and (2) developing and intensifying services to older employees.

This interdepartmental committee will initially be represented by the following departments: (1) health, (2) welfare, (3) employment security, (4) education, (5) administration, (6) conservation, (7) business development, (8) civil service, (9) veterans affairs, (10) fair employment practices commission, and (11) labor and industry.

This program is not concerned only with today but is geared toward long-range plans of the future. As thousands of Minnesotans join the ranks of the aged, the opportunities to remain contributing and contented citizens will be greatly enhanced to the benefit of the individual and the state.

American College Health Association News . . .

The Pacific Coast Section announces a meeting on November 30 and December 1 at the Benjamin Franklin Hotel, Seattle, Washington. The University of Washington will be the host institution. Joseph Trainor, M.D., University of Oregon Medical School, is the program chairman.

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Attention of all members of the A.C.H.A. is called to the Continental Casualty research grants announced at the Minneapolis meeting and available for research in student medicine for the year 1957-1958.

There are two grants of \$500 annually; one to a college under 2,000 enrollment and one to any larger college or university. The fund may be used for the sole support of exploratory or small scale studies or in conjunction with college or other funds to support sections of a larger scale study.

Recipients will be selected annually by the Committee on Research of the A.C.H.A. Proposals should be submitted—6 copies—to the committee by February 1, 1957.

All correspondence should be addressed to Dr. John Summerskill, Cornell University Health Service, Ithaca, New York, chairman of the committee. Other committee members are: Jean A. Curran, M.D., State University of New York; Paul O. Greeley, M.D., University of Southern California; Major William Hausman, M.D., United States Military Academy; William E. Taylor, M.D., Southwest Missouri State College; and Douglas S. Thompson, M.D., New York University College of Medicine.

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We wish to welcome a new member whose application has been approved by the Executive Committee:

Tulane University, New Orleans, Louisiana. Representative: Lloyd J. Kuhn, M.D., director of student health. Alternate: John H. Stibbs, Ph.D., dean of students.

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Ben H. McConnell, M.D., is the new director of medical services at Florida Southern College in Lakeland, Florida. Dr. McConnell will organize this year the first complete health service for the college.

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Dr. Paul L. White, director of the health service at the University of Texas and president of the A.C.H.A., announces the committee roster for the association for the year 1956-1957 as follows:

STANDING COMMITTEES OF THE COUNCIL

Executive Committee: Paul L. White, M.D., University of Texas, Austin; Carl Wise, M.D., Columbia University, New York City; Lewis Barbato, M.D., University of Denver, Denver; Irvin W. Sander, M.D., Wayne University, Detroit; Frank R. Smith, M.D., Johns Hopkins University, Baltimore; and Donald S. MacKinnon, M.D., University of California, Los Angeles.

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Local Sections Committee: Chairman—Bruce S. Roxby, M.D., Temple University, Philadelphia; Samuel I. Fuenning, M.D., University of Nebraska, Lincoln; and Gayle Pond, R.N., Western Michigan College, Kalamazoo.

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Committee on Health Service: Chairman—John G. Grant, M.D., Iowa State College, Ames; Donald W. Cowan, M.D., University of Minnesota, Minneapolis; L. W. Holden, M.D., University of Colorado, Boulder; Russell Blemker, M.D., University of Oregon, Eugene; Donald H. Petersen, M.D., St. Olaf College, Northfield, Minnesota; Frances Wiese, M.D., Mount Holyoke College, South Hadley, Massachusetts; and Morris A. Bowie, M.D., Swarthmore College, Swarthmore, Pennsylvania.

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Committee to Study the Financial Structure of A.C.H.A.: Chairman—Max Durfee, M.D., Oberlin College, Oberlin, Ohio; John W. Brown, M.D., University of California, Berkeley; Irvin W. Sander, M.D., ex-officio, Wayne University, Detroit, Michigan; Thomas V. Urmy, M.D., Williams College, Williamstown, Massachusetts; and Herbert Glenn, M.D., Pennsylvania State University, University Park.

Committee on Records: Chairman—Dana L. Farnsworth, M.D., Harvard University, Cambridge, Massachusetts; Leona B. Yeager, M.D., Northwestern University, Evanston, Illinois; Paul Schumacher, M.D., Miami University, Oxford, Ohio; Gilbert S. Coltrin, M.D., Associated Colleges, Claremont, California; Margaret Zeff, M.D., University of California, Berkeley, California; Dorothy B. Chamberlain, M.D., Bowling Green State University, Bowling Green, Ohio; Mrs. Albert O. Kiesow, University of Kansas, Lawrence, Kansas; Frances Stewart, M.D., University of Toronto, Toronto, Ontario, Canada.

Angiocardiographic Interpretation in Congenital Heart Disease, by H. L. ABRAMS and H. S. KAPLAN, 1956. Springfield, Illinois: Charles C Thomas. \$11.75.

This valuable monograph describes the historic background of angiocardiography as well as technics, contrast media, roentgen equipment utilized, reactions to angiocardiography, general principles of interpretation, and the role of aortography in diagnosis. The authors in their preface quite appropriately emphasize the important dividends that may be anticipated in terms of saving lives by attempting, as a matter of principle, to make definitive anatomic diagnosis in every case of congenital heart disease as soon as it is encountered, especially in infancy and childhood. An important adjunct in carrying out this ideal is angiocardiography.

This monograph summarized the authors' experience and covers in excellent fashion the major congenital cardiovascular anomalies in which angiocardiography has been of value.



Their roentgenographic reproductions are good and of value for study by those interested. Apparently relatively little use has been made of selective angiocardiography in diagnosing some of the complex cardiovascular problems. Likewise, a few errors appear in the text, particularly in regard to the physiology of some of the heart conditions, such as that occurring in the section on ventricular septal defects. The authors state that "where there is marked over-riding of the aorta, a right to left shunt may occur in the absence of pulmonary hyperten-

sion." This is mentioned in anticipation of its correction in future editions. Among the roentgenologic signs for diagnosis of a patent ductus arteriosus, one of the most valuable, in the reviewer's experience, in differentiating an intracardiac left to right shunt from an extracardiac left to right shunt; namely, the relative size of the aorta, is not mentioned.

C. WALTON LILLEHEI, M.D.

Textbook of Endocrinology, edited by ROBERT H. WILLIAMS, M.D., 1955. Philadelphia: W. B. Saunders Co. Second edition, 776 pages. \$13.

The present edition follows the usual approach to the subject of endocrinology. The book has been written by a group of 10 authorities in this field with present accepted theories and clinical pathogenesis of the subjects. The final chapter is of extreme value in that a thorough discussion was undertaken of the relationship of laboratory to the study (Continued on page 32A)



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BOOK REVIEWS

(Continued from page 372)

of the endocrine function. The text is complete; however, discussion on the possible endocrine functions of the thymus and pineal glands is lacking. The type is excellent and the illustrations well selected. The book is of value to the clinician.

DONALD S. AMATUZZIO, M.D.

• *Tumors of the Skin*, by HERBERT CONWAY, M.D., 1956. Springfield, Illinois: Charles C Thomas, 267 pages. \$13.50.

This is a fairly comprehensive monograph concerning the diagnosis and surgical management of benign and malignant tumors of the skin. The author briefly defines each tumor and gives a short description of its clinical characteristics and microscopic features. This is followed by statistic data on its relative incidence, based principally on experiences at New York Hospital-Cornell Medical Center. Suggested treatment, which is almost exclusively surgical, is then discussed in more detail. A short bibliography is included at the end of each presentation. The book is liberally illustrated with excellent photographs and artist's sketches depicting various surgical excisional technics and reconstructive and plastic procedures.

Overemphasis on the surgical management of these lesions is quite apparent, which is understandable, since the monograph was written by a surgeon primarily for surgeons. However, the author not only disregards many of the widely used and accepted nonsurgical methods, but actually condemns their use in many instances. This attitude is unfortunate and detracts somewhat from the completeness of the volume. Nevertheless, the book is well written and contains much useful information.

ELMER M. HILL, M.D.

• *The Management of Pain in Cancer*, edited by M. J. SCHIFFRIN, 1956. Chicago: The Year Book Publishers, Inc. 226 pages, illustrated. \$4.50.

This excellent book can be of great value to every physician who must care for men and women dying slowly of cancer. There are chapters on methods of nerve blocking, the new pain-relieving drugs, treatment by radiotherapy, and removal of glands of internal secretion. Sections are included on the psychologic aspect of the pain that develops in the terminal stages of cancer and on the psychic reactions between the physician and his patient.

WALTER C. ALVAREZ, M.D.

The Cervical Syndrome, by RUTH JACKSON, M.D., clinical assistant professor of orthopaedic surgery, Southwestern Medical School of the University of Texas, Dallas, 1956. Springfield, Illinois: Charles

C Thomas. 20 pages. \$4.75.

For a number of years Dr. Jackson has written and taught on the subject of the cervical syndrome and its proper treatment. In this short volume of just over 100 pages, she has included the pertinent facts relating to this problem. The x-ray reproductions and the drawings are excellently portrayed.

After reading the brief chapter on treatment, one is left with the impression that the patient with the cervical syndrome always responds favorably to treatment if properly carried out. Most orthopedists agree that some patients with this syndrome continue to present complaints for long periods even when the excellent treatment described by Dr. Jackson is carried out.

Dr. Jackson's excellently written monograph will be a valuable addition to any orthopedic surgeon's library. It will also be highly valuable to practitioners in other fields who see and treat patients having this common syndrome.

JOHN H. MOE, M.D.

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News Briefs . . .

North Dakota

THE NATION'S FIRST STUDY of the low incidence of coronary heart disease will be made among 6 northeastern North Dakota counties. The study, which began in September and will run until November 1957, will include the counties of Grand Forks, Pembina, Cavalier, Walsh, Nelson, and Ramsey. The Grand Forks District Medical Society is cooperating with Ramsey County physicians in this venture, which also has the support of the North Dakota State Heart Association. The investigation is in charge of Dr. Robert H. Lewis of the United States Public Health Service. Drs. Robert Painter and Lloyd Ralston of Grand Forks and Robert Fawcett of Devils Lake will plan, supervise, and correlate the information obtained. Objectives include comparison of farmers and nonfarmers in new cases of heart disease; correlation of occupation, physical exercise, smoking habits, diets, and other factors with new coronary manifestations.

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THE NORTH DAKOTA MENTAL HEALTH ASSOCIATION held its annual convention November 1 and 2 in Fargo. Principal speaker was Dr. Edward Litin of the psychiatry department at the Mayo Clinic.

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THE NORTH DAKOTA CANCER SOCIETY had as their theme "Lives Saved—Our Investment" at the annual meeting held September 27 and 28 in Fargo. In addition

to the meeting, a training conference for county and state volunteers of the society was held. The conference dealt with the effectiveness of cancer control in the community and cancer control for the future.

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THE NORTH DAKOTA chapter of the American College of Surgeons and the Grand Forks District Medical Society held a joint meeting in Grand Forks on September 22. Dinner speaker was Dr. Joseph H. Pratt of Rochester, whose appearance was arranged by the North Dakota Cancer Association.

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DR. VERL G. BORLAND, Fargo, has been elected president of the North Dakota chapter of the American College of Surgeons. Other officers include Dr. Alfred R. Sorenson, Minot, vice president; Dr. G. Howard Hall, Fargo, secretary; and Dr. Sorenson, Dr. John C. Fawcett, Devils Lake; and Dr. Jack W. Revere, Grand Forks, councillors. Dr. R. H. Waldschmidt, Minot, is governor.

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DR. WILLIAM C. HURLY will become a partner of Dr. V. J. Fischer, Dr. Roger Sorenson, and Dr. A. R. Sorenson in the new Minot medical clinic, which is to be named Doctors Clinic.

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DR. WARREN PIERSON, a member of the Bismarck Hospital staff for the past year, left for Alameda, California late in September to join the Navy.

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DR. JOHN F. CHOATE, a general practitioner at the clinic

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in Steinbach, Manitoba, since completion of his internship in 1955, has taken over Dr. D. W. Nagle's practice in Enderlin.

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DR. R. DONALD MCBANE, a native of Rainy River, Ontario, has established practice in Towner. Dr. McBané recently completed an internship at Winnipeg General Hospital.

Minnesota

A UNIQUE FEATURE of the new Faribault Medical Center, now under construction, will be the 7 individual suites of offices with private entrances from the outside. Laboratory, x-ray, and service departments will be centrally located and available to all physicians. This arrangement will provide more adequate therapeutic and diagnostic services for patients. The building, which will be entirely air-conditioned, is expected to be completed about January 1.

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DR. JACK GUY, New London, has been chosen chief of staff of Paynesville's first community hospital. Dr. Ray Lindemann, Paynesville, was named vice chief of staff, and Dr. Eldore Nash, Eden Valley, secretary-treasurer. The new 28-bed hospital was constructed at a cost of \$500,000. Funds were raised by residents of the area, sale of bonds, and through the Hill-Burton Act.

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THE GIBBON CLINIC, which has been closed for a year

and a half, reopened September 24. Office hours are 8:30 A.M. to noon Monday through Friday.

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DR. ARTHUR H. SANFORD, former head of clinical pathology at the Mayo Clinic, won the Scientific Products Foundation award for outstanding service in pathology and medicine. Presentation was made in Chicago during the meeting of the American Society of Clinical Pathologists.

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DR. HERBERT M. HIRSCH, assistant professor of cancer biology at the University of Minnesota, has been awarded an \$18,000 grant from the American Cancer Society and has been appointed a scholar in cancer research for three years.

• • • •

DR. HERMAN E. DRILL, Hopkins, has been elected president of the Hennepin County Medical Society, succeeding Dr. Robert E. Priest, Minneapolis, who is now chairman of the board. Other officers include: Dr. Karl E. Sandt, first vice president; Dr. Wellington W. Rieke, second vice president; Dr. Conrad J. Holmberg, secretary-treasurer; and Dr. Tague C. Chisholm, librarian.

• • • •

DR. LOUIS L. FREIDMAN, St. Paul, has been elected to the board of governors of the Minnesota Obstetrical and Gynecological Society.

• • • •

DR. WILLIAM L. BENEDICT, professor emeritus in ophthalmology in the Mayo Foundation, has been appointed

(Continued on page 36A)

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NEWS BRIEFS

(Continued from page 35A)

to the 12-member National Advisory Council on Neurological Diseases and Blindness to advise the surgeon general on research programs.

• • • • •

DR. CHARLES STROEBEL, Rochester, has been elected president of the Southern Minnesota Medical Association. Other officers include Dr. Leo R. Prins, Albert Lea; Dr. William Finkelnburg, Winona, vice presidents; and Dr. G. R. Diessner, Rochester, secretary-treasurer.

• • • • •

DR. EDGAR J. HUENEKENS, Minneapolis, was honored recently at a dinner given in recognition of his long service to pediatrics and to the community by members of the Minneapolis Pediatrics Society, many of whom had received their training from him. It was announced at the dinner that more than \$1,000 had been contributed to establish an Edgar J. Huenekens Memorial Library in the future Children's Hospital. Funds from the United Hospital Fund of Minneapolis and Hennepin County will be used to remodel the former Ripley Hospital into a children's hospital. With its completion, a lifelong dream of Dr. Huenekens' will be realized.

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DR. WILLIAM F. MALONEY, assistant dean of medicine at the University of Minnesota, has been named dean of medicine at the Medical College of Virginia in Richmond. Dr. Maloney will take office January 1.

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DR. WALDEMAR C. RASMUSSEN, former Mayo Clinic staff member and instructor in neurology at the University of Minnesota Foundation, is now consultant in neurology at the Colorado Springs Medical Center. The position became effective November 1.

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DR. DUANE SOMMERNESS, clinical director of the Fergus Falls State Hospital for the past two years, is now superintendent of the Traverse City State Hospital in Michigan. The new appointment became effective November 1.

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DR. JOHN S. HUFF, former flight surgeon at Bitburg, Germany, has joined the staff of the Owatonna Clinic.

• • • • •

DR. WILLIAM G. HALVORSON has become associated with Dr. Harold Coulter and Dr. William Hruza at the Madelia Clinic. Dr. Halvorson served as flight surgeon in the United State Air Force for the past two years.

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DR. AUSTIN C. DAVIS, a member of the Mayo Clinic staff for thirty-one years, retired from active practice October 1. An internist, Dr. Davis' special interest has been in diseases of the endocrine system. His research in this field included studies of the kidney, thyroid, pituitary, and suprarenal glands.

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DR. ADELAIDE M. JOHNSON, consultant in psychiatry at the Mayo Clinic and professor of psychiatry in the Mayo Foundation, has announced she will resign January 1. Dr. Johnson plans to enter private practice in Rochester.

South Dakota

DR. D. L. KEGARIES, Rapid City, has been elected president of the South Dakota Internal Medicine Society. Outgoing president is Dr. J. W. Donahoe, Sioux Falls.

• • • •

DR. VALENTINE C. MARR, of the McLaughlin Clinic, attended the fourth International Congress of American College of Chest Physicians, which was held in Cologne, Germany.

• • • •

DR. J. V. YACKLEY, after serving two years in the Army, has returned to Rapid City where he again will be associated with the Physicians and Surgeons Clinic.

• • • •

DR. THOMAS PRICE, JR., specialist in obstetrics and gynecology, has joined the staff of the Yankton Clinic. For the past year, Dr. Price has been associated with department of obstetrics at the University of Cincinnati.

• • • •

DR. VALDIS BRAKKS, physician and surgeon, joined the Medical Arts Clinic in Watertown October 1. A native of Latvia, Dr. Brakks came to the United States in 1950. He has been engaged in practice in Castlewood since 1952, the year in which he was licensed to practice in South Dakota.

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DR. G. H. LEEHUIS recently left Bowman, North Dakota, to establish practice in Lemmon. Dr. Leehuis practiced in Aitkin, Minnesota, several years before locating at Bowman.

Deaths . . .

DR. WILLIAM G. STROBEL, 70, former chief of staff of St. Mary's Hospital, Duluth, Minnesota, died September 27. Dr. Strobel has been associated with the Duluth Clinic since his arrival in that city in 1921.

• • • •

DR. GLEN P. SCHMITZ, 37, a surgeon in Little Falls, Minnesota, died September 19. Dr. Schmitz practiced in Holdingford, Minnesota, for about a year and a half before moving to Little Falls.

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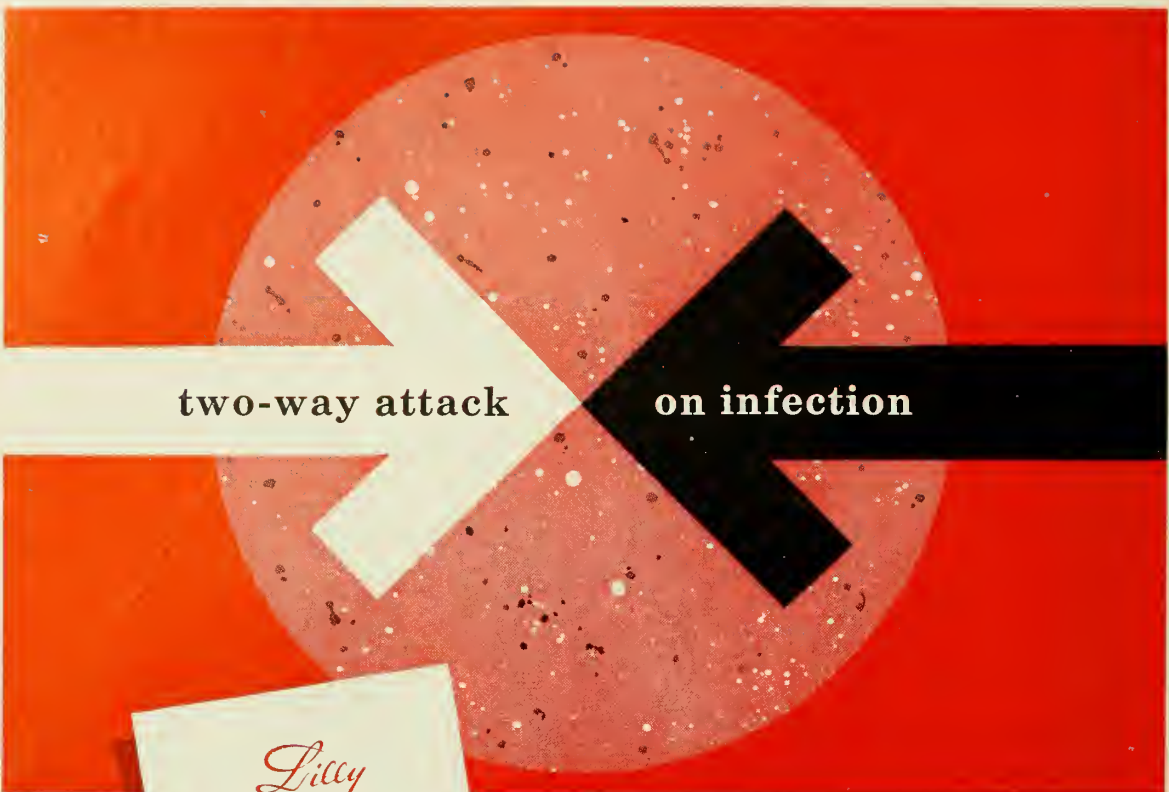
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'V-Cillin-Sulfa' provides you greater control over a wider range of microorganisms. 'V-Cillin' (Penicillin V, Lilly) and sulfas used concurrently produce faster and more effective antibacterial action in certain infections. In general, the combination is most beneficial in mixed infections, infections due to bacteria only moderately susceptible to either agent, and conditions in which bacterial resistance might develop.

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80TH ANNIVERSARY 1876 • 1956 / ELI LILLY AND COMPANY

COMING in *January*...

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- Ancel Keys, Ph.D., head of the department of physiological hygiene at the University of Minnesota, writes a fascinating letter from Moscow telling of his impressions and of events that occurred there during a busy ten-day interlude away from his month of research in Finland. His accounts of visits to clinics, laboratories, and institutes are intensely interesting as are the descriptions of receptions and dinners he and his colleagues attended. Somewhat surprising was the cordial hospitality with which they were greeted at all times.

- Many physicians tend to consider migraine headache a minor complaint and incurable. That such a conception is a fallacy is demonstrated by Nevil Leyton, M.R.C.S., of London, in his paper "The Modern Treatment of Migraine." A form of therapy is described that has proved successful in preventing or relieving the severity of such attacks in a large percentage of patients. Endocrine therapy and desensitization of affected tissues provide the broad basis of this method. In severe cases, hospitalization is required for best results. The need for the establishment of migraine clinics in large hospitals is stressed.

- The extreme variations in the behavior of thyroid tumors and differences of opinion concerning their pathology are the major factors responsible for the confusion that exists in regard to their treatment. "Surgical Treatment of Thyroid Cancer" by H. Mason Morfit, M.D., and W. L. Reimers, M.D., of Denver, Colorado, discusses controversies that arise over the types of operations required for the various sites involved. Facts are cited which support radical neck dissection as the procedure producing greatest salvage rates.

- "Cortisone Therapy in Lupus Erythematosus Disseminatus With Affection of the Central Nervous System" by Jan Presthus, MD., and Aasmund Skulstad, M.D., of Norway, is a case report of a woman with this disease whose most prominent symptoms were seizures and aphasia. The satisfactory results obtained with the administration of cortisone were first evidenced in the improvement of the patient's general condition. Although large doses of the drug were required in some phases of the disease, injurious side effects did not occur.

MEETINGS AND ANNOUNCEMENTS

UNIVERSITY OF MINNESOTA

MEDICAL CONTINUATION COURSES

December 6-8—Physical Medicine for Specialists

January 3-5—Urology for General Physicians

January 7-9—Dermatology for General Physicians

January 31-February 2—Emergency Surgery for General Physicians

February 7-9—Cardiovascular Diseases for General Physicians

February 11-13—Anesthesiology for General Physicians

February 11-16—Neurology for General Physicians and Specialists

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

PROCTOLOGY AWARD

The International Academy of Proctology will award a \$100 prize and a certificate of merit for the best unpublished contribution on proctology or allied subjects. Entries must be received by February 1 and should be addressed to the International Academy of Proctology, 147-41 Sanford Ave., Flushing, New York.

CENTENNIAL EXPOSITION

The Academy of Medicine of Cincinnati will celebrate its 100th anniversary February 27 through March 5 in Music Hall, Cincinnati. Free lectures will be given, and medical and health films will be shown at intervals during the exposition, which is open to the public.

NATIONAL HEALTH FORUM

The 1957 National Health Forum will be held March 20 through 22 in Cincinnati at the Hotel Hilton Plaza. It will outline what is now known about fostering mental health and encourage more effective use of that knowledge.

ESSAY ON PHYSICAL MEDICINE AND REHABILITATION

An award of \$200 is being offered by the American Congress of Physical Medicine and Rehabilitation for the best essay on any subject related to this field. Manuscripts must be limited to 3,000 words, received by June 1, and addressed to the American Congress of Physical Medicine and Rehabilitation, 30 N. Michigan Ave., Chicago 2.



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Changing Concepts in the Treatment of Diverticulitis of the Sigmoid

JOHN M. WAUGH, M.D., AND
ALEXANDER J. WALT, M.B., F.R.C.S.(C.)
Rochester, Minnesota

RECENT YEARS have seen a rising interest in the surgical management of diverticulitis of the sigmoid colon. Partly because of a more widespread awareness of the condition and the increasing longevity of the population, the average practitioner is encountering more instances of this disease than before. The general dissatisfaction manifested toward the surgical management of diverticulitis until recently is possibly of equal importance. In many respects, the surgeon actually was not responsible for the dissatisfaction, since too often he was called only to deal with sudden and serious complications which demanded emergency measures. Faced with such a prospect, the surgeon usually was forced to resort to a hastily performed transverse colostomy. Then, if the patient survived, a series of subsequent operations was performed. Weakened by sepsis, burdened with a colonic stoma, and demoralized by long hospitalization and economic loss, such patients constitute a difficult problem. However, with the modern aids available, a benign disease should not be allowed to impose such severe, avoidable morbidity.

It is estimated that about 10 per cent of people more than 40 years old and about 50 per cent at about 75 have diverticulosis of the colon. Symptoms of diverticulitis will develop in about a fifth of these, the incidence increas-

ing with age. Of those with diverticulitis, 15 to 25 per cent will require operation.

As surgeons, we are mainly concerned with this group. Advances in the management of this disease at present are concerned with two factors. First, the recognition, before complications develop, of patients who require operation; Second, a one-stage resection with primary anastomosis without associated colostomy for such patients and for some with relatively minor complications. The advantage of this procedure is apparent, since it reduces hospital stay, decreases the number of operations required, eliminates the unpleasant colonic stoma, and ensures immediate ablation of the diseased area.

There are two inherent dangers in this recommended procedure. First, operation may be advised when vigorous medical treatment alone might produce complete resolution. Second, a one-stage operation may be unwise in the face of unsuitable conditions. While the consequence of the first course of action might be an unjustifiable operation, the result of the latter might be an unnecessary necropsy. The selection of patients for operation unquestionably requires judgment, but to delay until perforation, obstruction, or formation of fistula has occurred is not justified. Furthermore, since the mortality rate associated with colonic resection has declined rapidly in recent years, it can be

JOHN M. WAUGH is with the section of surgery at the Mayo Clinic and is professor of general surgery in the Mayo Foundation. ALEXANDER J. WALT is a fellow in surgery in the Mayo Foundation.

Read at the sectional meeting of the American College of Surgeons, Milwaukee, Wisconsin, February 28 and 29, 1956.

performed with increased safety for patients with intractability evidenced by recurrent, disabling attacks of diverticulitis, often with temporary subacute obstruction. Resection should be considered for the patient who has recovered from one or two subacute, walled-off perforations and whose colon on roentgenologic examination shows the changes of diverticulitis.

SYMPTOMATOLOGIC ASPECTS

Abdominal pain. This type of pain is the symptom most frequently encountered. In most cases, it accurately reflects the nature of the underlying pathologic process. On occasion, however, the acuteness and extent of the inflammatory process far exceed the subjective symptoms.

When obstruction caused by edema or fibrosis is pronounced, a common occurrence is a cramping pain in the left lower abdominal quadrant, which is relieved by the passage of flatus. Frequently, the pain is described as a "dull ache," and may be most extreme in the lumbar region. In a few cases, the pain extends down the leg. Some patients describe a sharp, cutting sensation, and when irritation of the parietal peritoneum on the right side also is present, the preoperative diagnosis of "acute appendicitis" sometimes is made. Chills and fever frequently occur and often lead to hospitalization if accompanied by abdominal distention and pain.

Urinary symptoms. Although pneumaturia is noted in all cases of sigmoidovesical fistula, with or without the passage of fecal material, the presence of dysuria, frequency of urination, nocturia, and a sensation of incomplete emptying of the bladder may provide warnings of impending disaster. These symptoms, however, occur far less often among women, who have the anatomic advantage of the uterus and adnexa interposed between the sigmoid and the bladder. Symptoms appear related to unaccustomed physical exertion and are of serious import. Many such patients are candidates for elective operation after inflammation has subsided in order to avoid development of a sigmoidovesical fistula.

Change in bowel habit. The majority of patients complain of constipation, and some note a diminution in the caliber of the stool. A fair number, however, have episodes of alternating constipation and diarrhea, and a few have diarrhea alone. The production of large amounts of mucus is not uncommon.

Melena. Although alarming bleeding from the rectum may occur in diverticulitis, this is rarely the sole factor by which operation is determined. When rectal bleeding occurs, it is usually slight and difficult to establish clinically

as originating from the area of diverticulitis. We have noted it in about 10 per cent of patients. Sigmoidoscopy and roentgenologic examination of the colon are essential features in any thorough appraisal of these patients.

Presence of intra-abdominal mass. A mass within the abdomen is palpable in about 50 per cent of patients. In most cases, it is best felt through the abdominal wall in the region of the sigmoid, but, in some, it may be palpable only on rectal or vaginal examination. In these instances, the question of carcinoma sometimes arises when the clinical history, roentgenologic findings, and sigmoidoscopy are equivocal.

If the foregoing symptoms are kept in mind and correlated clinically with the progress of the underlying disease, operation may be advised at the optimal time for those with threatening complications. Thus, much suffering of both the patient and the surgeon may be prevented.

ONE-STAGE RESECTION

We recently analyzed the records of 320 patients with diverticulitis of the sigmoid who were operated upon at the Mayo Clinic from 1945 to 1954. Certain distinct trends could be discerned, and some clinical impressions were confirmed.

The percentage of patients whose condition was judged suitable for one-stage resection has steadily increased. Of the 320 patients, 93 or 29.1 per cent were treated by this procedure. Only these will be discussed here. In the early years of the study, most of these operations were forced on the surgeon, so to speak, because it is impossible to distinguish between diverticulitis and carcinoma accurately. However, the excellent results gradually encouraged use of the one-stage procedure for patients with unequivocal diverticulitis. There has been no reason to regret the more radical approach now employed. Complications have been relatively few, and only one patient died, producing a mortality rate of 1.1 per cent. Necropsy showed a bleeding duodenal ulcer caused this death.

During this period, the rate of resectability in all cases of diverticulitis increased from about 75 to more than 90 per cent. This is partly due to the use of broad-spectrum antibiotic agents and perhaps also to the patients' increased willingness to seek medical treatment earlier than in the past. As stressed before, now that resection can be performed with such favorable results, unsatisfactory response to medical therapy may be regarded as a legitimate indication for early operation. When the ideal of early intervention is not achieved and the optimal time for operation is missed, one-stage resection still

may be possible in many cases. Contrary to the generally expressed view that an established sigmoidovesical fistula demands a three-stage procedure with preliminary colostomy, 15 of our 93 patients who underwent one-stage resection had active sigmoidovesical fistulas at operation. In 14 others, the sigmoid was firmly attached by inflammatory adhesions to the wall of the bladder. No further urinary difficulty occurred in any of these patients postoperatively.

Extensive inflammation is not necessarily a contraindication to one-stage resection. In about half the cases, the mesentery of the sigmoid was much thickened, vascular, edematous and the site of small abscesses. These factors effected pronounced restriction in mobility of the involved portion of bowel. By careful dissection, however, and particular attention to the area over the ureters, the mass could be removed and continuity was re-established satisfactorily.

As was true in other series, our series also demonstrated that the close resemblance diverticulitis may bear to carcinoma is noteworthy. In about 20 of the 93 cases, the malignancy factor was impossible to exclude with certainty, even with the lesion in the surgeon's hand. This problem paralleled the preoperative difficulty experienced by the roentgenologist who, in this group of subsequently proved instances of diverticulitis, thought a malignant process was definitely present in about 5 per cent of cases and that the possibility was equivocal in another 15 per cent. When doubt exists, malignancy should be assumed and resection should be extensive, with removal of an adequate amount of bowel and subtended mesentery.

Unless one-stage resection removes an adequate length of bowel, its purpose fails, and the patient is exposed to additional attacks of diverticulitis. All diverticula need not be removed, but the bowel must be resected beyond the area of inflammation. There have been no recurrences in our series, to our knowledge, indicating that there is no need to compromise the extent of resection in the one-stage resection. In those few in whom diverticulosis extends to the transverse colon, all the affected area may be removed.

The reduction of postoperative illness and complications after one-stage resection is reflected in the average hospital stay of only sixteen days, as compared with the lengthy convalescence imposed by multiple-stage procedures.

COMMENT

The primary treatment of diverticulitis remains medical and is based on rest in bed; a bland, low-residue diet; regulation of bowel move-

ments; and the use of broad-spectrum antibiotic agents. When this regimen is followed, about 80 per cent of patients should avoid operation.

When disease does not respond adequately to these measures, resection of the involved area must be performed. Ideally, this should be done when the disease is quiescent. The bowel should be thoroughly prepared, and the procedure should be carried out before complications preclude a possible single-stage operation. If the conditions meet these requirements, the single-stage operation can be performed with little postoperative illness, few complications, and almost no deaths. Even when the inflammatory process appears rather widespread and when a sigmoidovesical fistula is already present, the possibility of a one-stage resection should not be rejected without careful study. Proximal colostomy is no longer regarded as a routine concomitant of the surgical treatment of diverticulitis, although the need for sound judgment in these matters cannot be overemphasized, since the consequence of error may be death of the patient. A preliminary transverse colostomy will always be necessary in a fair proportion of patients. In others, the addition of a proximal colostomy at the time of anastomosis may be lifesaving. The important point is to fit the operation to the pathologic findings as revealed at operation, rather than to attempt to carry out rigid, preconceived ideas. In the former course, the one-stage resection will be safe and satisfactory for about three-fourths of patients who require surgery for diverticulitis of the sigmoid.

Hopes for further improvement are based largely on the individual practitioner's vigilance and his willingness to consider surgical intervention before appreciable disability or serious complications threaten. The main indications for elective operation today are: (1) intractability, with consequent recurrent episodes of inflammatory difficulties; (2) subacute obstruction; (3) walled-off perforation which responds temporarily to antibiotic agents and to nonsurgical treatment; (4) unexplained melena in the presence of roentgenographic evidence of diverticulitis; (5) the presence of a fistula between the sigmoid and other organs, including the skin; (6) recurrent or persistent urinary symptoms caused by the diverticulitis; and (7) the persistence of a palpable mass or deformity from which malignancy cannot definitely be excluded. If operation is performed soon after the appearance of any of these developments, most postoperative illnesses and complications and almost all the deaths associated with diverticulitis in the past will be avoided.

Restoration of Arterial Flow in Ischemic Extremities by Bypass Homograft

Harold Laufman, M.D.

Chicago, Illinois

SYMPOMATIC ISCHEMIA of the legs in a surprisingly high percentage of patients is due to arteriosclerotic segmental occlusion of large vessels — popliteal, femoral, and iliac arteries and aorta. In our experience, 78.3 per cent of patients with symptoms of diminished blood supply to the legs exhibit occluded femoral or iliac arteries. However, only 74.2 per cent of this group, some 50 per cent of the total, are considered suitable for arterial surgery. Consideration of cardiac and other clinical findings further lowers the surgical case material to 43 per cent of the total number subjected to arteriography.

Several modes of treatment are now available, some indirect, some direct, but all designed to augment the blood supply to the foot and leg. Among the indirect methods are sympathectomy, vasodilating drugs, and physical vasodilating measures. Prior to the advent of direct arterial surgery, the indirect measures, in one combination or another, were applied to all cases, since no other technics were available.

In general, there are 3 direct methods: endarterectomy, arterial resection with replacement, and bypass graft without resection. The first widely used direct method was endarterectomy. This procedure, although still useful in isolated cases, has met with limited acceptance because of its potential failure. However, in experienced, skilled hands, endarterectomy is a very useful technic. But the risk of the condition becoming worse or of actually precipitating gangrene looms as a deterrent to the use of this method in the majority of cases.

With the advent of technics employing arterial homografts, venous autografts and homografts, and vascular prostheses, substitution of the occluded vessel with a patent implant became feasible. However, resection of the occluded vessel with end-to-end graft replacement, especially in long segments, carries an undeniable risk of fail-

ure which can lead to loss of the limb. Its disadvantages are several: (1) a large part of the operation is devoted to resection of the occluded segment; (2) collateral channels are unavoidably sacrificed; (3) the anastomotic junction is narrower than the vessel above or below; (4) the graft is usually obligatory; and (5) failure may be critical.

The bypass principle, initiated in 1951 by Kunlin¹ of Paris who originally used a vein graft to bridge an arterial defect, did not enjoy widespread acceptance until the past two or three years. During this period, homologous arterial grafts have become more available and pliable prostheses have been improved. Several American surgeons²⁻⁶ have already reported sizable series of bypass arterial grafts.

Reasons for the popularity of the bypass method are obvious. The risks inherent in endarterectomy or in arterial resection with graft replacement are virtually eliminated by the bypass operation. The graft is not obligatory, since existing circulation is neither disturbed nor endangered. Failures appear to occur less frequently than with other procedures. Except when the occlusive disease progresses very rapidly in the host vessel, failure of a bypass graft results in a circulatory status no worse than had been present prior to surgery. Reoperation in the event of failure is usually feasible and may be successful. Because of the simple technic, the operation renders itself adaptable by any surgeon with experience in vascular work.

It is ludicrous to presume that all patients with intermittent claudication can be treated with one mode of therapy. Obviously, diagnostic measures must be employed to determine the nature of the arterial defect. Yet for many years, patients with calf claudication were managed by essentially the same pattern of therapy — vasodilating measures and/or lumbar sympathectomy. The fact that no more than 50 per cent of the patients responded to treatment was

HAROLD LAUFMAN is associate professor of surgery at Northwestern University Medical School and on the staffs of Passavant Memorial and Veterans' Administration Research hospitals, Chicago.

From the Department of Surgery, Northwestern University Medical School, Chicago.

accepted as an unalterable therapeutic impasse.

With the advent of arteriography, it became possible actually to visualize the arterial disease, localize and measure the occlusion, and determine the adequacy of the vascular bed distal to the occlusion. However, it is neither feasible nor necessary to subject every patient with claudication to arteriography.

ARTERIOGRAPHY

Our decision to perform an arteriogram upon a patient with claudication or impending gangrene is governed by certain criteria. Ordinarily, if normal bilateral ankle artery pulsations and/or bilateral popliteal artery pulsations are present, aortography is unnecessary. However, when pulsations at the popliteal level or lower are greatly diminished in a symptomatic limb, arteriography may yield valuable information upon which a therapeutic approach may be based. Occlusions below the popliteal artery are unsuitable for grafting procedures and, therefore, are considered for sympathectomy.

Arteriography of the lower extremities is usually done in either the femoral artery or aorta. A needle inserted into the femoral artery is much less hazardous than direct aortic injection. Consequently, if at least one femoral artery has normal pulsations, we believe this vessel should be used for the site of injection. If the patient is thin, the needle, 15 gauge, usually can be inserted transdermally without difficulty. In heavier patients, the artery is exposed by a small skin incision, and the needle is inserted under direct vision. We believe the cutdown method is the safer of the two. The vessels of both legs are visualized regardless of the site of injection. In the case of femoral artery puncture, a polythene catheter is passed through the needle up into the aorta to a point about 1 in. proximal to the bifurcation.

When no pulsations are palpable in either femoral artery at the groin, direct translumbar aortography is indicated. This route should also be used when one or both femoral pulses are very weak. A weak pulse usually implies a partially occluded vessel, and injection into it may lead to thrombosis. Aortography is attended by definite risks and complications, but these can be greatly minimized by observing certain safeguards.

The relative contraindications to direct translumbar aortography are: (1) pronounced calcification of the aortic wall at the proposed site of injection; (2) aneurysm at the injection level; (3) inability of the patient to tolerate the prone position; (4) distortion of landmarks due to

spinal deformity or other factors; and (5) neurologic disease involving the lower extremities. Anteroposterior and lateral routine roentgenograms of the lower thoracic and lumbar spine are required in order to determine some of these relative contraindications and should always be made prior to aortography.

In a large number of cases, either the trans-aortic or transfemoral approach may be used with equal safety. In another category, one route has definite advantages over the other; in a few cases, both routes are closed. The last-mentioned group includes patients with excessive aortic calcification as well as absent femoral pulses. In some of these cases, it may be necessary to proceed with surgery without angiography or to attempt visualization via the brachial artery. The actual step-by-step technic of angiography that we have employed has been described in other publications.^{7,8}

We perform an arteriographic examination on every patient with symptomatic arterial disease of the lower extremities who meets the requirements mentioned and for whom no contraindication for the examination exists. We believe that only by this means can patients who are suitable for direct surgery be separated from those for whom conservative therapy or sympathectomy is more desirable. The hazards of arteriography must be fully appreciated before it is undertaken.

THE BYPASS OPERATION

The pathology in all our cases was that of occlusive arteriosclerotic disease. Arteriography was done by the transaortic route in about one-third of the patients, and by the retrograde route through a pulsating femoral artery in two-thirds.

The prime indication for the bypass operation, as performed by our group, is intermittent claudication or ischemic pain associated with an impalpable pulse distal to the proved occlusion. One of our patients had gangrene of the great toe.

In our experience, the occlusion was in the femoral artery in most instances; the remainder occurred in the iliac artery or extended from the iliac to the femoral artery. The occlusions varied from 2.5 cm. in length to total absence of an arterial lumen from the aortic bifurcation to the popliteal artery.

Patients were denied bypass surgery when the following situations prevailed: (1) myocardial damage of such severity that improvement in circulation to the legs might have allowed more ambulation than the cardiac status could tolerate; (2) almost complete absence of distal ar-

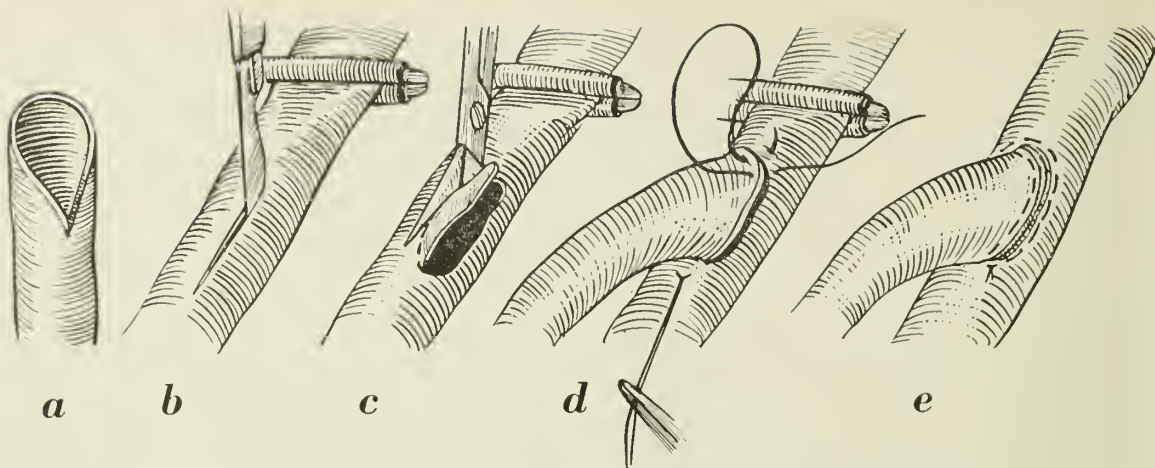


FIG. 1. Salient features of anastomosis technic. (a) End of graft shaped to permit flare; (b) incision in plaque-free area of parent vessel; (c) oval window cut; (d) everting keystone mattress stitch at upper and lower angles; (e) anastomosis completed with continuous everting or over-and-over suture.

terial runoff below the popliteal artery, as demonstrated by arteriography; and (3) total absence of popliteal artery lumen.

Material for grafting consisted of lyophilized arterial homografts in most instances. Edwards' crimped elastic nylon tubes were implanted in a few recent cases.

In most cases, the graft was made to bridge not only the actual occlusion but also the narrowed lumen above or below it. Sites suitable for the end-to-side anastomoses are usually easy to determine from the appearance of the vessel on the arteriogram.

The shorter femoral-to-femoral grafts can often be handled through a single incision. The larger grafts are usually implanted by means of two or more skin incisions, each placed over the sites of the proposed anastomoses. In such cases, the graft is threaded through a tunnel created by blunt finger dissection.

The end-to-side anastomosis is made by choosing an area in the host vessel relatively free from sclerotic plaques. The vessel is dissected from its attachments without disturbing collateral channels and after clamping and injecting 5 cc. of a dilute heparin solution distally, an oval window is cut in the side of the vessel. The end of the graft is shaped and cut on a bias so that it presents a flare or bell shape. Anastomosis is then made either by an over-and-over suture or by an everting suture using 00000 arterial silk in the femoral artery and 0000 arterial silk in the iliac artery and aorta (figure 1). An important feature of the anastomosis is the everting keystone stitch placed at the upper and lower angles of the anastomosis before inserting the running stitch on either side. After completion of the first anastomosis, the graft is filled with heparin

solution and any leaks are repaired. The clamps are removed from the host vessel and the graft allowed to pulsate (figure 2). Any defections in the anastomosis are repaired by an extra stitch if necessary. The pulsating graft is threaded through a previously created channel to the area of the second anastomosis, which is made in the same manner as the initial anastomosis after trimming and preparing the end of the graft.

Wounds are closed without drainage. Dressings are held in place with elastic adhesive, with care taken not to encircle the limb. Ambulation is permitted in forty-eight hours to five days, depending on location of the graft. Longest period of immobilization is granted to patients with an anastomosis in the popliteal artery (figure 3).

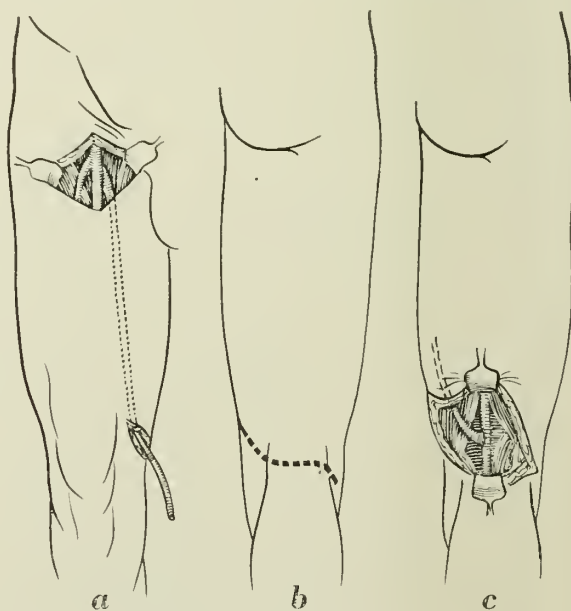


FIG. 2. Incisions for femoral-popliteal bypass graft.

RESULTS

Restoration of pulsations distal to the graft may occur as soon as surgery is completed or may take as long as a week. If the distal runoff is adequate prior to surgery, remarkably good distal pulsations can usually be palpated on the day of surgery. Pulses returned immediately in about two-thirds of our cases, the other successful cases taking four hours to seven days.

Patients whose distal pulses did not return after surgery represent approximately 20 per cent of the total. It must be emphasized that our immediate failures occurred in patients with extremely long bypass grafts, while results were excellent in other patients with long grafts. In none of the failures did the patient's condition grow worse. Therefore, we believe the operation should be offered almost regardless of the length of the occlusion, provided the distal runoff is adequate and the patient meets the other preoperative prerequisites mentioned previously. However, it is obvious that the longer the graft, the less chance of permanent success.

Delayed failure occurs in some cases and is usually due to delayed hemorrhage or delayed thrombosis. An advantage of the bypass procedure is the feasibility of reoperation in the event of failure. In two instances, we successfully bypassed the original bypass. One of these secondary operations was completely successful; the other served for four months before an embolus occluded the proximal stoma.

Of our cases, 19 have now been followed for about two years. No delayed failures have occurred beyond four months postoperatively.

COMMENTS

Because of its relatively simple technic and negligible risk, the end-to-side bypass lends itself readily to many types of vascular occlusion from the common iliac artery to the popliteal artery. Selection of patients with adequate distal runoff, as evidenced by angiography, is of prime importance. Occasionally, patients with less than adequate distal circulation obtain some benefit if the graft remains patent. Postoperative edema of the ankle with the resumption of pulses tends to develop in patients in the latter category.

We believe that several specific factors are responsible for failure and can be guarded against in the selection of patients. For example, chance of success appears to be greater with short grafts. Next, the more distal an anastomosis, that is, low in the popliteal artery, the greater the chance of delayed occlusion, possibly because of motion of the knee joint.

Many poor-risk patients can tolerate bypass



FIG. 3. Tracing of arteriogram showing bypass of femoral occlusion as well as adjacent narrowed lumen.

surgery of the lower limb extremely well. If necessary, the entire procedure may be carried out under local anesthesia. However, patients who have severe cardiac, renal, or pulmonary disease in addition to claudication are usually not acceptable for bypass surgery. Additional ability to walk may add to the severity of the coexisting disease.

From the technical point of view, we believe the bypass operation is superior to resection and end-to-end anastomosis because it preserves all

collateral channels, dissection is limited, and the risk of gangrene is virtually nonexistent. We have had no mortality.

Long-term follow-up studies will determine the ultimate value of restoring circulation to ischemic limbs. The natural history of patients with grafts must eventually be compared with that of patients treated by other means. In the meantime, the rehabilitation of a large percentage of otherwise incapacitated individuals is gratifying to observe.

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DEATH OCCURS in about 13 per cent of patients within three years after onset of claudication, and within five years in about 25 per cent.

Annual death rate with claudication is about 2 per cent among patients under 50 years of age at onset, 6 per cent among those 50 to 59 years of age, and 9 per cent among those 60 or over. Mortality is lower when only 1 leg is involved. Amputation is necessary in about one-fourth of patients but is required less frequently if onset is early than if disease begins late.

Mortality and incidence of widespread atherosclerotic changes, bilateral claudication, and cerebral and coronary thromboses are greater among hypertensive patients than among persons with normal blood pressures.

Cardiovascular disease is the cause of death in about one-half of patients. Only about 20 per cent of patients have angina pectoris, but electrocardiographic abnormalities are demonstrable in almost 50 per cent.

W. B. SPAULDING, M.D.: *Canad. M.A.J.* 75:105-111, 1956.

RAPID REWARMING AND ELECTROSHOCK may successfully combat ventricular fibrillation during hypothermia and intracardiac surgery. The patient should be warmed by pouring saline solution heated to 40° C. into the thoracic cavity if electroshock is ineffective at low temperatures. Damage to heart muscle and psychic disturbances are rare if cardiac massage is begun immediately and continued until defibrillation. Apparently, maintenance of efficient circulation by massage is facilitated by hypothermia.

E. HUSFELDT, M.D., and O. SECHER, M.D.: *Thorax* 11:67-70, 1956.

The Healing Arts In Korea

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IN SEPTEMBER 1954, the University of Minnesota entered into a contract with the International Cooperation Administration for the purpose of assisting in the "stimulation and development of education and research in the fields of agriculture, engineering, and medicine" at the Republic of Korea National University in Seoul. The following remarks are based on my experience in Korea during the spring of this year as medical advisor to Seoul National University Medical School. This is only one of several such programs under ICA in which American universities, and especially medical schools, are assisting throughout the world. I might also add that this was personally a thrilling and rewarding experience.

Korea was little known to the modern western world until the closing months of World War II, although the first treaty establishing diplomatic and trade relationships between the United States and Korea was signed in 1882.

The Korean peninsula is thrust down off the coast of Asia between the 35th and 45th parallels and separates the Sea of Japan from the Yellow Sea. It is approximately the size of Minnesota, a mountainous land only 20 per cent arable. The population is 30 million compared to Minnesota's 3 million. This population density per square mile is exceeded in only a few countries of the world. Its climate is much like that 200 to 300 miles south of Minnesota.

Korea was settled in prehistoric times by two groups of people, one from north central Asia through Manchuria; the other, who also settled Japan, came from the south by way of the Pacific Islands. These two groups mixed and absorbed the Chinese who immigrated at various times, resulting in the Korean nation of today.

By virtue of its geographic position, Korea has been a battleground for other people's wars for centuries. The people have seen the rise and fall of many dynasties within, as well as many inva-

sions from without, including the Chinese, the Mongols under Genghis Khan, the Japanese, and the Russians. The feudal form of government and the strife of many centuries have understandably influenced the Korean culture of today and, of course, the practice of medicine and medical education.

On the primitive worship of Shintoism that respects gods and the magic of shamanism that respects demons have been successively superimposed the medicines of ancient China, of India, with factors known to have been blended from Greece, the priest medicine of the Buddhists, influences from Persia, Arabia, Turkistan, and from the southwest Pacific area. The healing arts of Old Chosen, the Korea of 2,000 years B.C., like those of other primitive people, ascribed disease to the acts of evil spirits and attributed cure to the expulsion of these demons. By the time of Christ, a two-dimensional theory had evolved including the body and immortal soul. Drugs, acupuncture, moxocautery, and hot springs were all in use.

The "older brother-younger brother" relationship with China, established in the second century B.C., and which existed intermittently through much of Korea's history, has been a principal force in shaping Korean medicine. During the age of the Three Kingdoms, roughly seven hundred years before the eighth century A.D., Chinese medicine became firmly established. With it came the speculative and metaphysical interpretations that dominate the forms of healing arts other than western medicine. These conceptions exist in Korea even today.

During the same period, Buddhism was brought indirectly through China, and with it, the belief that freedom from disease was gained by the mercy of Buddha. Naturally, the Buddhist priests became involved in medical affairs and the priest-physician appeared and added prayers, hymns, and more charms to the therapeutic armamentarium. Indian medicine, theories, and therapeutics were thus introduced by the priests. These involved variations of the

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Presented at the Minnesota Medical Foundation Day, University of Minnesota, October 1, 1956.

Chinese concept of major elements, functions, and airs. For example, the four major troubles were life, death, disease, and senility.

Organization of medical education appeared when Korea was unified under one dynasty, The Shilla. In 692 A.D., Shilla opened a medical school. Until that time, medical education had been only an apprenticeship system. The texts, used well over a thousand years ago, are the major classics in Chinese herb medicine and are still essential reading for the students of oriental medicine. These volumes cover such subjects as herb pharmacology, acupuncture, and the art of palpating the pulse.

Investigations in anatomy began. The study was not systematic but was only used to indicate positions for palpation of the pulse and sites of acupuncture and moxocautery. Osteology was the best developed study. By 980 A.D., a state examination system for the medical profession was established, and medical practice of a relatively high order became organized.

Explanation for the cause of disease in this oriental system lacks anatomic and physiologic basis, and its theories and principles are nothing more than superstitious hypotheses. Yet clinical therapy, based on years of experience and observation of the action of drugs, and with emphasis on the psychologic aspects of diagnosis and treatment of illness, probably explains why oriental medicine still exists and flourishes in Korea, and the remainder of the Orient, after more than two thousand years.

Western medical concepts were not introduced until the beginning of the present century when Japan annexed and occupied Korea. Japan was experiencing tremendous cultural growth and expansion when western technics were sought. Its medicine was primarily the old German system. During these same years, American missionaries began medical educational efforts, the best known being Severance Medical College, still operating in Seoul today. Thus, Japanese occupation saw a European type of medical school established in Korea with the German system of academic autocracy. The word and opinion of the professor were law and not to be questioned. Of course, the Koreans through long centuries had already learned that to criticize, question, or even comment was to insult authority. In addition, education under the Japanese did not include education of Koreans for academic positions. These were reserved for the Japanese and only a few Koreans were able to receive graduate training.

Finally, World War II ended the Japanese occupation in 1945. But the real growth of the

western-type medical school was further interrupted in 1950 by what the Koreans consider a war analogous to our own Civil War. The political history of this fought-over land of Korea is occupied by internal and external wars, conquest and occupation by many other nations, and rule by selfish and ruthless emperors in a feudal system that conditioned people to resist and mistrust outsiders and all authority and to seek isolation and refuge behind the walls of their homes. As a result, a sense of obligation is lacking to anyone outside the family. Community interest is unknown. Consequently, a large part of the public health course in the medical student's senior year is devoted to instilling in him a true concept of public health and community responsibility.

Religion has been another influence shaping the Korean culture. Today no particular creed is followed with any amount of fervor by more than a small percentage of the people. But inevitably, the marks of some of the past religions have been left on the total cultural pattern. Thus, from shamanism, which dates back to prehistoric times, there lingers a belief in spirits. If a person becomes sick or has bad luck, it is because some spirit is angry or has managed to gain control over him. To drive away these spirits, Shaman priestesses, called Mudangs, must perform certain ceremonies which are expensive and consist of chanting, dancing, and beating on gongs.

We can also note the influence of Confucianism, the system of ethics based upon the teachings of the Chinese scholar of the sixth century B.C. Today the ceremonial part of the religion is almost completely dead, but its moral ideas still govern the lives of many people, particularly those of the educated classes who have not accepted Christianity.

The following teachings bear on health matters. The main goal in Confucianism is not to change society radically in order to improve it, or to secure a good life after death, but to continue to follow the way of life practiced by one's ancestors. All emphasis is laid on imitating the past, not on constructing the future. Above all, a man's actions must exemplify filial piety. Due to this emphasis, veneration of ancestors became an integral part of the religion. Thus, a body cannot be touched after death except by the family, and a postmortem examination is out of the question. In addition, the ancestor's spirits, if proper burial rites are observed, are believed to help the descendants. Even today many patients are removed from the hospital shortly before death so that they can die at home and their spirits remain there. Some spirit beliefs are

the cause of trouble in this modern age. Some believe that if an evil spirit is following, and they can be missed narrowly enough by a car, the evil spirit might be hit. The result, of course, is a very high number of accident cases in hospitals.

The Confucian system forced women to live in segregated parts of the house where they could not be seen by men other than their husbands. Even today, women are reluctant to be examined by anyone. The cooperation necessary for modern clinical teaching of medical students is difficult to obtain.

Add the recent war to all these important factors which bear on the healing arts of present-day Korea and the establishment of western medical teachings and technics! Many physicians and medical students died or were captured. Those students of the war years who did survive received spotty educations. Libraries and equipment were almost totally lost.

Finally, this already medically handicapped community must bear the addition of public health problems of a postwar country superimposed on the intrinsic public health problems of an overcrowded and underdeveloped oriental nation.

These factors make the presence and the abilities of the 40 faculty members of Seoul National University Medical School, whose presence we enjoy, all the more remarkable. The cultural barriers, lack of men, materials, money, and other economic advantages in a war-torn nation are being surmounted to an amazing degree by this eager and intelligent nucleus of men.

Let us examine briefly the adverse conditions under which these men work. Seoul National University was organized in October 1945 under Act 102 of the United States Military Government in Korea, and utilized buildings of the former Keijo Imperial University Faculty of Medicine left by the Japanese. With the Communist invasion in 1950, the school was forced to move to Pusan, where it operated without books, most equipment, and without 70 members of the faculty and over 100 students who had been abducted to the North.

When the faculty and students returned to Seoul in 1953, the school was reopened. Fortunately, the 4 basic science group buildings and the 15 hospitals, accommodating 500 patients, survived the war. But, they were completely empty. Today, a faculty of almost 100 men teach in the medical school for \$126 per month for professors, and \$80 a month for instructors — sums insufficient for livelihood.

About 450 medical students attend the univer-

sity. Each student pays a yearly tuition of \$95 for the privilege of attending lectures from 8 A.M. to 5 P.M., Monday through Saturday. Students live long distances from school in rooms usually without heat, and with light only from 8 to 11 P.M. Surprisingly enough, even with this full-school schedule, they find time for an active extracurricular program, including a 20-piece student symphony orchestra and intramural basketball, soccer, and track teams of first place caliber.

Seoul National University is the largest of 8 medical schools in the Republic of Korea. These schools now graduate approximately 500 students a year. Half of the schools are supported by missionary or private groups and the other half are government schools. There is approximately 1 medical doctor for each 6,000 people in South Korea. These doctors and educators must still battle for uniform standards for medical schools and for licensure examinations which do more than ask questions of theory. They must struggle for the right to dispense drugs, a right given exclusively to pharmacists by Act of the National Assembly in 1953, and for financial support.

The majority of the people are not cared for by medical doctors. They are perhaps mostly treated by practitioners of oriental or herb medicine. In 1951, the Ministry of Education approved the establishment of the College of Oriental Medicine. That same year, the National Assembly re-established the licensure of such practitioners previously removed by the United States military government.

Oriental medicine is based on psycho-metaphysical theories in which pathologic symptoms are regarded as manifestations of the abnormal inner vital life, caused by imbalance of 2 normally opposing, but balanced, forces. In another way, one might say that in oriental medicine, all illnesses are essentially functional or psychosomatic. For example, bacteria are recognized, but these organisms are believed to cause illness by more fundamental disturbance in the active state of the subjective life spirit itself, rather than initiating the illness by their virulence.

There are two types of universal vital forces — the Um and Yang — or negative and positive principle. From the oriental point of view, the human body exists in a state of equilibrium in regard to Um and Yang, although this equilibrium is unique for each individual and is congenitally and quantitatively balanced in varying ratios. Thus, the male has a preponderance of Yang, and the female has more Um. Drugs are also grouped in this manner. The negative drug

is cold and cool, and the positive is hot and warm. Treatment attempts to adjust these antagonistic forces by using drugs to replenish or reduce the quantity of Um or Yang to a normal state.

Diagnosis is accomplished by inspecting the color of patient's skin and face, listening to the patient's voice, anamnesis, and palpation of the patient's pulse. Palpation of the pulse is the most important. There are 24 varieties of pulses, such as small, sunken, vacant, real, and so on. To examine the pulse, 3 fingers are placed in each radial artery, each to detect a particular malfunctioning organ. No clinical observation is used to associate the pulse with the symptoms of disease.

The second important principle in oriental medicine is the theory of 5 primary elements: fire, wood, earth, metal, and water. These represent the vital spirits of the universe and of all creatures. They are represented in the human body by 5 viscera: liver for wood, heart for fire, spleen for earth, lungs for metal, and kidney for water.

The viscera are supplemented and assisted by 6 influences: wind, cold, heat, drought, moisture, and fire. These are represented in the body by 6 ventral-tubular viscera: the urinary bladder, small and large intestines, stomach, gallbladder, and body cavity, including mediastinum and pelvic cavity. Their function is to absorb nutrition. For example, remedies of "cold and coolness," according to prescriptions, would be used to inhibit the fire of the heart and accelerate the water of the kidney. It is interesting that the lungs, heart, and liver were related to the hemovascular movement. Incidentally, the gallbladder produces "decisiveness and courage."

Thus, about 20 medicinals are prescribed with attention paid not only to their presumed effect upon absorption, but also to color and odor. They are boiled together in a special pot, which every family owns, and the resulting brew is drunk by the patient.

Acupuncture is another healing art. The practitioner often uses herbs and also punctures vital points with silver needles. The methods of diag-

nosis and the philosophy involved are the same as described previously, with the addition of the concept of some peripheral master areas which control the viscera. The silver needle is inserted, sometimes to a depth of 3 in., into areas designated as master areas by ancient charts of the body. For example, the needle is inserted over the seventh thoracic vertebra for the heart and over the right upper thigh for the stomach. In addition, superficial needle pricks are used to cause bleeding and thus relieve congestion.

A third adjunct, moxacautery, is often added or even used alone. Consecutively, 5 or 6 one-quarter inch cone-shaped pellets of moxa grass are rolled deftly between the assistant's fingers, placed on the patient's skin at the master area, lighted, and allowed to induce a third-degree burn at that point.

The rigors of jujitsu necessarily brought about the healing arts of another country and another jujitsu teacher himself. The bone setter still practices this healing art in Korea. However, he is no longer licensed as he was under the Japanese.

Finally, the "witchwoman" or Mudang, is called to dance and chant away the evil spirits which possess the sick patient. This ritual occasionally ends in a frenzy in which not only the Mudang, but the onlooking family flail the patient with ropes or sticks to drive out the demons.

This presentation has been a brief report of the healing arts of another country and another culture. On the other side of the world at this same moment, medical students are entering Seoul National University to gain the same knowledge for which our medical students strive. Their handicaps and hardships are immeasurably greater. The flags of the United States, United Nations, and Korea, which wave above the parade ground at eighth army headquarters in Seoul, symbolize the greatest international cooperative effort to assist with men, money, and heart ever given to one nation's people. It is a thrilling experience to know that we at the University of Minnesota are contributing in a small way to help Korean physicians bring education and health to their people.

Treatment of Eye Injuries

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ALTHOUGH often an important aid in the diagnosis and treatment of eye injuries, a detailed case history must be deferred in some cases, such as chemical injuries, until first aid and preliminary treatment have been given.

Pain is a frequent symptom and is a typical occurrence in corneal abrasions, foreign bodies of the upper palpebral conjunctiva and elsewhere on the globe, and lacerations of the eyeball. It is noteworthy that a small intraocular foreign body may not be associated with pain and may be symptomless in the early stages.

When diminished vision is reported by the patient, intraocular pathology must be suspected, such as a foreign body, primary or secondary iritis, lens opacity, intraocular hemorrhage, and glaucoma. A mucopurulent conjunctivitis is a likely possibility if history reveals a copious discharge without visual loss and a low-grade stinging pain. Virus infection may be considered when the eye is irritable, without a history of a foreign body, corneal erosion, entropion, or trichiasis.

Previous ocular disease may be very pertinent in the treatment and assessment of vision of eye injuries. Diseases such as keratoconus, amblyopia, with or without strabismus, and corneal opacities from previous injuries may be the actual cause of diminished visual acuity rather than the injury of recent date. Glaucoma, previously present in an injured eye, very materially affects the treatment and visual result of recent injuries.

General health is also an important factor to be assessed as early as possible. Diabetes and hypertension as well as other general debilities often cause loss of vision which may be associated, in the patient's mind, with an ocular accident. This should be noted to prevent future controversy.

The psychologic factor may be significant. Occasionally, the symptoms continue long after

the lesion has healed because the patient fails to adjust to his environment. The full-time industrial physician or surgeon can often be of valuable assistance in such cases. Sometimes it is important to know the nature of any first-aid treatment that may have been given.

PRELIMINARY EXAMINATION

Apart from injuries demanding immediate treatment, for example, chemical burns, the vision is recorded before treatment is begun. If the patient wears glasses, the vision is recorded with the glasses on. If the vision is subnormal, vision is recorded in each eye with the pinhole aperture.

Armamentarium. Adequate illumination is essential. A good direct light source is required in most instances, but oblique illumination in a darkened room is invaluable for the detection of corneal abrasions and stains. An ophthalmoscope with a plus 5 lens or a retinoscope enables the surgeon to visualize slight central corneal defects, which stand out in relief against the red fundus reflex when the fundus is viewed from a distance of 5 or 6 in. Of course, other deeper defects are also discovered by this means. Magnification is of great value. A good loupe is most useful and the biomicroscope is even more so.

Anesthesia is a prime requisite to foreign-body treatment. An 0.5 per cent solution of Pontocaine is satisfactory.

A fine-pointed sharp knife or spud is essential to remove embedded foreign bodies. The foreign body should be lifted out of the eye through a tiny corneal incision, rather than by means of a picking or scratching maneuver.

Additional necessary items include a 2 per cent solution of fluorescein sodium for staining the corneal epithelium, moist cotton applicators to remove superficial foreign bodies, 2 per cent silver nitrate for cauterization, Gundersen's solution for sterilizing a corneal lesion, a 4 per cent cocaine hydrochloride solution, saline or distilled water, and an apparatus for irrigating the conjunctival sac.

Presented at the Great Northern Railway Surgeon's Association meeting at Winnipeg, Manitoba, May 29, 1956.

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A sterile technic is of utmost importance, of course. However, it should be noted that virus infections of the eye transmitted by the treatment center have been frequently reported.

FOREIGN BODY OF THE CORNEA

The transparent structure of the cornea is of paramount importance to vision. A foreign body must be removed with as little accompanying trauma as possible. The patient should report for treatment at the earliest possible moment, since the difficulties of removal and treatment and the occurrence of complications increase directly in accordance with the duration of the injury.

A superficial foreign body may be easily removed with a moist cotton applicator. The cornea is then stained, and, if an abrasion has occurred, an eye pad is applied for twenty-four hours. In any case, an antiseptic ointment such as 10 per cent sodium sulfacetimide is instilled.

If the foreign body is embedded in the corneal epithelium, it is removed with a spud, taking care to avoid abrading the epithelium unnecessarily.

A more deeply situated foreign body is removed with a sharply pointed spud. The point is inserted into the cornea at the margin of the foreign body, and the latter is lifted out carefully so that excessive trauma to the cornea is avoided. All fragments of the foreign material are removed and the edges of the corneal wound are made clean-cut to avoid infection.

If the foreign body is very deeply embedded, care must be taken not to push it into the anterior chamber of the eye. In such cases, a broad corneal knife or keratome is inserted into the corneal layers from one side so that it comes to rest deep to the foreign body. The foreign body is then removed in the usual manner. If the foreign body is magnetic, its removal may be facilitated at times by the use of a powerful magnet.

When the foreign body injury is extensive or of long duration and the possibility of infection is great, the site of the foreign body is treated with Gundersen's solution and neutralized with a 4 per cent cocaine solution.

When the foreign body is more or less deeply embedded and considerable manipulation is necessary, 1 per cent atropine ointment is instilled into the eye as well as an antibiotic or antiseptic ointment, and an eye pad is applied. Because the patient may be in pain, Butyn and Metaphen ointments are usually prescribed. The patient is re-examined every twenty-four hours for as long as necessary in order to treat complications if they occur. The patient should be advised to

instill the antiseptic ointment three times daily for several days after fluorescein ceases to stain the corneal lesion, since the epithelium is delicate and may be easily abraded for some time after injury.

Foreign bodies located near the center of the cornea must be removed with great care, as a scar in this region affects the visual acuity. During the last visit, it is important to record the visual acuity and assess the amount of visual loss, if any.

If feasible, a rust ring left by an iron foreign body is removed entirely, as otherwise healing is delayed. It is important to avoid excessive curettage in this process, as a bit of remaining rust is better than an unduly damaged cornea. When the rust ring is difficult to remove, a second trial may be made twenty-four hours later, since the lapse of time enables the foreign-body reaction of the cornea to soften the rust stain. Application of 2 per cent silver nitrate to the rust stain is another useful measure. This softens the rust stain and facilitates its removal. Occasionally, a dental burr is useful for removal of the rust stain.

FOREIGN BODY OF THE CONJUNCTIVA

A foreign body superficially placed on the bulbar or palpebral conjunctiva is easily removed with a moist cotton applicator. A thorough search of the upper cul-de-sac is important or a foreign body may be missed. The use of a lid retractor is essential for this purpose.

A more deeply embedded conjunctival foreign body is removed with a sharp instrument as described for similar corneal foreign bodies. The instillation of an ointment such as penicillin or 10 per cent sodium sulfacetimide should be routine. An eye pad is not required.

BLEPHAROCONIOSIS AND KERATOCONIOSIS

A worker exposed to fine powdery particles shows a low-grade irritation of the conjunctiva and cornea, thus facilitating the onset and development of both pinguecula and pterygium. Prophylactic measures and symptomatic treatment are indicated in these cases.

CHEMICAL EFFECTS OF FOREIGN BODIES

Multiple foreign bodies of the cornea and conjunctiva occur most often in blast injuries, and it is often difficult to remove them all without excessive manipulation. In cases in which the foreign bodies are relatively inert, some of the smaller particles are best left in situ. When the foreign material exerts a harmful chemical action, every particle should be removed.

Glass, plastics, gold, coal, stone, and lead are relatively inert substances and are well tolerated by the tissues. On the other hand, copper and iron are very irritating and cause degeneration of the affected tissues.

CHEMICAL INJURIES OF THE EYEBALL

Chemical agents comprise 12 to 20 per cent of industrial hazards and, in modern industry, the number of different noxious chemical substances is legion. The ocular damage is increased with the concentration of the chemical and duration of its action. Since the chemical reacts only in solution, the more soluble the agent, the greater the ocular damage. Also, because the epithelium and endothelium are lipophilic, they are somewhat resistant to water-soluble agents and susceptible to fat-soluble chemicals. The stroma of the cornea is hydrophilic and so is susceptible to water-soluble chemicals and resistant to fat-soluble agents. Some substances consist of both water and fat solubles and thus penetrate the ocular tissues deeply, causing the most damage.

Acids are usually water soluble, so do not penetrate the ocular tissues deeply and are, therefore, more amenable to treatment. Alkalis are also water soluble but saponify the epithelium and thus penetrate deeply into the tissues, because after the lipophilic epithelium is traversed, passage into the hydrophilic stroma is unimpeded. Sulphur dioxide, ammonium hydroxide, mustard gas, and detergents are examples of water- and fat-soluble substances which are very damaging to the eyeball. In addition, the chemical properties of the noxious agent exert important effects.

TREATMENT OF CHEMICAL INJURIES

With a few industrially unimportant exceptions, neutralization of the chemical agent is not feasible. Therefore, the best treatment is immediate copious irrigation of the eyeball and cul-de-sacs with water, in order to dilute and to wash away the noxious agent. Undissolved particles must be removed by means of a cotton applicator.

Use of local anesthetics should be restrained, since they damage the corneal epithelium, make it more susceptible to chemical damage, and retard the reparative processes. An 0.5 per cent pontocaine solution is recommended when pain must be relieved to lessen blepharospasm and thus enable the surgeon to inspect and treat the eye injury. Contaminated necrotic conjunctiva and corneal epithelium should be removed, and the resulting defect may be covered with dry fat-free human amniotic membrane or egg membrane. Usual ocular measures follow next, such

as rest and the instillation of atropine and antibiotic ointments. It is notable that penicillin ointment may retard epithelial regeneration. Relief of pain is best accomplished by systemic measures.

Having carried out the initial treatment, attention is now directed toward prevention or amelioration of the later effects. These consist mainly of the excessive scar tissue development with resulting deformity, such as symblepharon, entropion, and blepharophimosis.

Passing a vaseline-coated glass rod between the eyelids and the eyeball at each dressing is a common treatment. However, early excision of necrotic conjunctival tissue, with mucous membrane grafting of the defect, is more effective.

In serious corneal scarring, a lamellar corneal transplant may be performed after a suitable time interval. Due to the vascularization which follows severe chemical burns, the graft often becomes opaque, but if a perforating keratoplasty is performed later, it may remain clear.

Hydrocortisone drops may be of value in the earlier treatment phase to lessen scar tissue and new vessel formation. Later, beta radiation may be worthwhile in the care of corneal opacities due to neovascularization.

EYELID LACERATIONS

Such lacerations usually heal well because of the abundant blood supply. When the laceration is extensive or if it tends to gape, a careful closure with fine silk interrupted sutures promotes rapid healing.

CORNEA AND SCLERA LACERATIONS

Large perforating lacerations of the cornea and sclera require suturing with fine black silk interrupted sutures. All foreign material should be removed and, if an iris prolapse is present, the extruded iris tissue should be excised. Exact coaptation of the wound edges is important and magnification is of real help to this end. With a perforating laceration, the possibility of an intraocular foreign body should always be determined by roentgenography. It is also a valuable step to dilate the pupil and inject air or sterile water into the anterior chamber to prevent the development of posterior and anterior synechiae.

A word of caution regarding the initial examination is appropriate here. I have experienced cases in which the perforating laceration appeared to be minor, only to discover at operation that the laceration extended for a considerable distance into the sclera and was concealed by edematous bulbar conjunctiva. If the patient

squeezes his eye or moves it unduly during the initial examination, there is great danger of losing the eye from extrusion of the intraocular contents. Moreover, the same complication may occur during the administration of a general anesthetic before the surgeon has an opportunity to suture the wound. Therefore, only a careful and brief preliminary examination should be carried out before applying firm eye bandages to both eyes. Prior to the administration of the general anesthetic, if it is necessary, the eyelids are immobilized with a careful Van Lint or O'Brien akinesia, and the eyeball is quieted by a cautious retrobulbar injection of Novocain. If facilities are available, this situation is ideal for the use of curare. The usual precautions are taken to avoid infection, and the sutures are left in situ for fifteen days, as the corneal wound does not heal firmly prior to this time.

CONTUSION OF THE GLOBE

This lesion usually stems from a blow with a blunt object and results in a wide variety of ocular damage, depending upon the severity of the trauma.

Hyphema may be minor, consist of fluid blood, and absorb quickly with rapid return of vision. However, on occasion, the surgeon is dismayed by a severe secondary anterior chamber hemorrhage which results in absolute secondary glaucoma, much pain, and often loss of vision in

spite of all therapeutic measures. Therefore, I advise both physical and ocular rest. Perhaps the best procedure is to admit the patient to the hospital and pad both eyes. Usually, the pupil is left undisturbed by instillation of either a miotic or a mydriatic at the time of initial examination.

Secondary hemorrhage with glaucoma requires paracentesis of the anterior chamber and evacuation of the blood. Probably, eserine should be used at this time to constrict the pupil. Paracentesis may have to be repeated, and sometimes the hemorrhage promptly recurs each time. Results in these cases are almost always poor.

When blood in the anterior chamber is in the form of a clot, adhesions develop between the cornea, iris, and lens and, together with occlusion of the angle of the anterior chamber, result in secondary glaucoma. It is essential to make a keratome opening into the anterior chamber and remove the blood clots with a fine non-toothed iris forceps. If bleeding recurs, the keratome incision may be opened daily with a fine iris spatula and the blood evacuated.

Blood staining of the cornea, which reduces the vision to light perception, occurs in the more severe cases, especially when secondary glaucoma is present and if the endothelium has been damaged. This clears from the periphery toward the center after many months, leaving some visual impairment.

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SUBCONJUNCTIVAL injection of combined penicillin and streptomycin is a successful means of preventing purulent endophthalmitis after cataract extraction. At the conclusion of extraction, 0.25 cc. of a specially prepared solution of the antibiotics is injected with a 25- to 27-gauge needle opposite the incision, usually at 6 o'clock, several millimeters from the limbus. Although postoperative chemosis and redness are increased slightly, no serious allergy results.

MAURICE D. PEARLMAN, M.D.: *Arch. Ophth.* 55:516-518, 1956.

Comparison of Reserpine and Harmony1 in Psychiatric Patients

A Preliminary Report

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IN 1955, Stoll and Hofmann¹ first reported the isolation of a new alkaloid from the root of *Rauwolfia canescens*, which they named canescine. This alkaloid has also been investigated under the name of raunormine and, in addition, has been referred to as recanescine² and deserpidine.³ The name Harmony1 was used for the present investigation.

The structure of this alkaloid¹⁻³ is generally agreed upon, which chemically is 11-desmethoxyreserpine. The structural formula is shown in comparison with that of reserpine (figure 1).

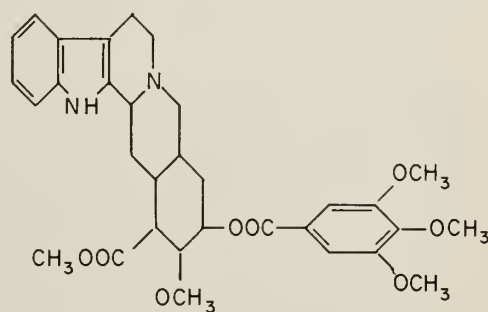
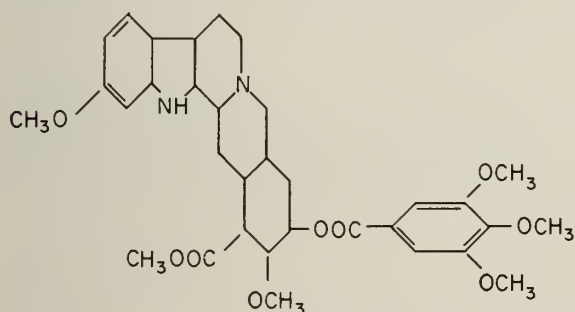


FIG. 1. Formula at left is reserpine. Formula at right is Harmony1.

In view of the widespread interest and use of reserpine in psychiatric practice and in other fields, and since preliminary pharmacologic studies⁴ suggested that Harmony1 would have a similar action, it was thought worthwhile to attempt clinical evaluation of this related alkaloid. Although the present series is small, some definite valuable impressions have been gained from our usage of Harmony1.

The present study shows the results of Harmony1 treatment on 47 patients. No attempt has been made to draw statistical conclusions from such a small series. The aim was to evaluate Harmony1 as an aid in treatment of psychiatric

cases and, specifically, to attempt to define its similarity and difference to reserpine. Our impressions to date are summarized as follows:

1. Patients requiring 1.0 to 5.0 mg. of oral Harmony1 3 times a day showed decreased motor activity apparently comparable to results recorded for those receiving the same amount of oral reserpine. There is, however, a pronounced difference. Patients given reserpine show a slow, steady decrease in overactivity. On Harmony1, the reduction is more dramatic. The patients reflect barbiturate relaxation but are awake.

2. The dose range of 1.0 to 5.0 mg. three times daily indicated Harmony1 was more potent than reserpine in controlling aggression. To achieve an equal therapeutic effect, the Harmony1 dosage is one-half to two-thirds the required dosage of reserpine. Again, however, the difference is dramatic. With reserpine, aggression decreases gradually and mental clouding clears slowly. With Harmony1, patients appear to lose their "surly" or aggressive attitude more quickly, but an air of levity tends to develop.

3. In the dosage we employed, patients receiving Harmony1 appeared less capable of sustained concentration than those receiving reserpine. Their progress in our rehabilitation pro-

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This investigation was carried out at the Traverse City State Hospital, Traverse City, Michigan.

gram was consequently impaired to some extent.

4. Side effects were notably absent in patients treated with Harmony. Two patients who developed a "poker spine" on 0.5 mg. of reserpine, three times daily for three to five days, failed to show any such development after receiving 2 mg. of Harmony three times daily for three weeks. Their motor activity and aggressiveness were also more reduced on Harmony. Stuffy nose, red eyes, and diarrhea did not appear on doses of Harmony that were 2 to 3 times those required to reduce motor activity. A group deliberately overdosed with Harmony until they developed a definite underactive behavior pattern showed no reactions or side effects. Laboratory studies during this project demonstrated no changes in the complete blood count, non-protein nitrogen, thymol turbidity, blood sugar, or urinalysis that were due to the drug.

5. More overactive patients benefited from oral Harmony than from oral reserpine. The impression, therefore, is that the added number receiving benefit is in excess of 15 per cent. However, the number benefiting from oral Harmony is still somewhat lower than the number benefiting from *parenteral* reserpine. This may indicate a difference in absorption as well as in action between reserpine and Harmony.

6. Of 5 patients not controlled by reserpine, 3 showed better behavior patterns with Harmony. Their actions are very similar to those seen with phenobarbital, but with the advantage of being awake.

7. When Harmony was added to the regime of 2 patients who were under treatment for postencephalitic parkinsonism, no improvement occurred.

SUMMARY AND CONCLUSIONS

1. Clinical results are reported in a series of 47 patients treated with Harmony, a new alkaloid of the Rauwolfia series.

2. Points of difference and similarity with the action of reserpine are affirmed. The most notable impressions were the absence of side effects and relatively rapid onset of action with Harmony.

3. Although no final conclusions can be drawn from this preliminary study, this information may be of interest to other investigators and indicates that Harmony may possess some advantages over reserpine. We believe the drug is worthy of continued investigation and clinical appraisal.

The Harmony was supplied by Abbott Laboratories, North Chicago, Illinois.

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SCHIZOPHRENIA occurs most frequently among persons who have been deprived, unhappy, and insecure during childhood because of parental loss or rejection.

About half of schizophrenic patients have been rejected or overprotected by one or both parents. About two-fifths are, by death, divorce, or separation, deprived of mother or father before reaching the age of fifteen years. Such family situations are apt to (1) cause persistent frustrations of basic needs; (2) induce strong guilt feelings as a result of hostile wishes toward the parents; (3) impede identification with adequate parental figures; and (4) impair the child's self-regard. These stresses may be handled by regression, and the child, prematurely faced with his own inadequacy and vulnerability, may utilize the defenses of fantasy, dereistic thinking, and withdrawal, thus laying the groundwork for later mental illness.

Schizophrenia is more common among youngest than among oldest children. Conflicts regarding sibling position do not, however, precipitate schizophrenia unless associated with pathologic parental attitudes or parental loss.

A large proportion of schizophrenic patients come from families with 4 or more children. Possibly, increased difficulty in identification with parents, intensified sibling rivalry, and other stresses in a large family contribute to the development of schizophrenia.

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College Education for the Handicapped Student

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COLLEGE MAY PROVIDE the only opportunity that a physically handicapped person will have to attain a successful career. Vocational and economic independence require assets of commercial value. Strength, mobility, speed, and skill may be lost through physical handicaps. Useful knowledge and the means by which it can be put to use are the saleable assets of the physically handicapped. Sometimes adequate means of selling knowledge may be difficult to find if the physical handicap is severe. Patients with handicaps may have trouble traveling to and from work. They may not be able to use public transportation and may have to spend large amounts of money to travel by taxi or special car. They may not be able to go up ramps or climb stairs. For most jobs, mobility of this type is necessary.

Other persons, more handicapped, may not be able to care for all of their daily needs. These have been named by Dr. George Deaver of the New York University Institute of Physical Medicine and Rehabilitation "The Activities of Daily Living."

The activities of daily living can be divided into 7 categories:

1. Bed activities — moving about, rolling over, sitting up.
2. Hygiene — washing, shaving, attending to toilet needs.
3. Eating — use of spoon, fork, knife, cup.
4. Dressing and undressing.
5. Sitting — getting into and out of chairs and using a wheelchair.
6. Ambulation — walking on the level, stairs, or ramps.
7. Communications and utilities — various hand activities.

As a person develops these abilities, he frees himself from dependence on others. In the absence of these abilities, movements are greatly restricted. Handicapped persons may require

various assistive devices. Canes, crutches, wheelchairs, braces, and splints are commonly used. Sometimes special devices are necessary which may be very simple or very complicated. In spite of maximum rehabilitation and the best possible assistive devices, the severely handicapped patient may achieve only partial independence and be able to work only under restricted conditions. The deaf and the blind are examples of physically handicapped persons whose greatest disability is in the area of communications. Hearing aids, lip reading, or Braille may help greatly. Blind persons may require reading assistants. Some persons may write very slowly or illegibly. They may need standard or electric typewriters. Others may be able to record only by some system of dictation.

For some patients, lack of social acceptance is the greatest handicap. This applies particularly to patients with cerebral palsy. The writhing and grimacing movements of the athetoid patient make most observers so uncomfortable that they refuse to associate with him. In part, this is due to fear and uncertainty of how such a person will act. In part, it is because he cannot conform to accepted patterns of activity. We associate his lack of physical control with lack of control in other ways. In the minds of many people at a conscious or subconscious level is the belief that those with cerebral palsy are psychotic or mentally retarded as well as physically handicapped.

Recently there has been an accelerating drive to provide college education to physically handicapped persons capable of using it. The value of this policy has been demonstrated repeatedly. However, our college training programs are designed for students who are physically normal. In order to train disabled students, our facilities and programs must provide certain modifications. Some of our own patients illustrate some of these needs.

A young man bent over a drafting board does

Presented at the annual meeting of the American College Health Association in Minneapolis, May 19, 1956.

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not appear to be handicapped until you notice his braces. In an automobile accident somewhat more than a year ago, he suffered a fracture of the tenth thoracic vertebra resulting in complete paralysis below that level. He has strengthened his arms and shoulders so that he can walk slowly with crutches. He can go up and down stairs and get into and out of cars. He can dress, bathe, and care for his daily needs. He has an intelligence quotient of 120 and an interest and aptitude in architecture. But, he will have problems when he goes to school. He walks so slowly that for practical purposes he will have to travel by wheelchair. This means that he must attend classes in buildings accessible by wheelchair, and stairs will present a barrier. Steps and curbs also interfere. Healthy young persons can learn to go up and down curbs in a wheelchair. The more daring may even tackle stairs. However, for practical purposes, either an elevator must be available or the classes must be on the ground floor or arrangements must be made for assistance each time stairs are attempted.

Since this student can care for all of his needs, he can live in a dormitory which is accessible by wheelchair. He has special problems, however. During the time that he had an indwelling catheter immediately after his injury, he developed a chronic cystitis. Now he voids by exerting pressure over the lower abdomen so a catheter is no longer necessary. The cystitis has never been cured, although it is controlled by Gantrisin. Occasional attacks of cystitis will occur and require medical attention at the health service. He must be watched to see that difficulty from bladder or renal calculi does not develop. He is on Basaljel to minimize this hazard. The development of ischemic ulcers on his buttocks caused by sitting for long periods of time is his greatest hazard. Remember, this patient has no sensation below the midthoracic level. He does not perceive pain or discomfort in the skin of the buttocks, and, consequently, no automatic alarm signals him to move periodically. Persons with normal sensation shift position when they become uncomfortable after sitting for a while. Often we are not even aware of these sensations which force us to shift position. If we are forced to sit quietly, this feeling of pressure eventually becomes a dull burning and then an intense burning sensation. This pressure over the ischial tuberosities is many times greater than the blood pressure in the capillaries, so that no blood flows through the skin or muscle over these pressure points. Shifts of position allow circulation to these ischemic areas. The muscular activity associated with walking greatly increases the circula-

tion to this area and restores nutrition and metabolism. The paraplegic patient who sits for prolonged periods has no sensation, cannot use muscular activity to increase circulation, and is especially susceptible to ischemic ulcers. He should shift position or stand every few minutes by the clock to reestablish circulation through his "sitting skin."

A young man who just graduated from high school was the victim of a diving accident. While on an outing with his friends, he ran out onto a dock and dove into unknown water. The water was only 18 in. deep. He suffered a fracture dislocation of the fifth cervical vertebra on the sixth cervical vertebra with complete transection of the cord at that level. He is paralyzed below the C5 cord segment. Now he can move his neck and barely flex or abduct his shoulders against gravity. He can flex but not extend his elbows. He has no other motion in his forearms or hands and no function in his trunk or lower extremities. He can become only partially independent in his activities of daily living. He cannot move in bed or from bed to chair without help. He cannot dress, care for his toilet needs, or feed himself alone. Some sort of a device must be found to substitute for the lost function of his hands. A hook prosthesis similar to that used by an amputee is fairly useful for these patients. They can carry out many activities if they learn to use such a hook. The hook is activated by a cable running to the other arm. When the left arm is abducted, the hook opens. An elastic binder provides the tension to close it.

If this young man is to become even partially self-supporting, he must do so by developing and using his brain. This presents serious problems. He can communicate by talking. He will have difficulty recording information, since he can write or type only very slowly and poorly. If he goes to college, an attendant will have to help him care for personal needs, dress, eat, and ambulate. The problem of going to and from classes will be difficult, since most university buildings have many steps. How far are we willing to adapt our training programs to teach such a patient? A telephone or television contact with the classroom might enable him to take many courses. What is going to be required of a patient of this type for laboratory courses? To what extent can a curriculum be adapted to meet his needs?

Adaptations of teaching programs are expensive. Each time we provide special facilities or special courses, the cost of education increases. On the other hand, the cost of maintaining these

disabled patients is also very high. Each patient of this type costs the community thousands of dollars each year for support. With modern medical care, these patients may live many years with a continuing cost of maintenance. When these persons can be trained to be partially or completely self-supporting, the cost to the community can be greatly reduced and at the same time the patients' lives become much more enjoyable because they are of some value to themselves and to others.

A patient confined to a Foster bed for six months with a broken neck has a lot of available time. What is he to do with it? If function of his arms or hands is limited, he can do very little except to think or observe. This time could be put to good use with a suitable training program. He can read books if he is provided with a suitable page turner. He can use a book projector to read the printed word projected on the ceiling. If he has grasp in his hands, he can write on a suitable table below or above his bed. He can also perform hand activities. A planned program can advance such a patient's education and also relieve him of boredom and instill in him the feeling that he is progressing.

Every college can do some things to help physically handicapped students carry on a successful study program. Students with minor physical handicaps need no special consideration. Those who are more severely disabled require special programs which may necessitate special facilities while at college, special course work, evaluation of vocational problems after college, and consideration of emotional and personality problems. For help with these matters, a vocational counselor, preferably a trained rehabilitation counselor, is necessary. First of all, we should be sure that the training plan is realistic. Can the student do the work he has outlined for himself after he has completed his training? I don't want to stress the negative side of this phase of counseling, because we find that many physically handicapped people are afraid to undertake careers which they are capable of handling. On the other hand, we do find severely disabled patients with good minds who go through college only to find after graduation that they have no saleable assets. They never adequately considered how they were to make use of their training. Sometimes we find that these students are entirely unrealistic about their abilities. Sometimes they do not have the imagination to develop and utilize the abilities they do have. A trained rehabilitation counselor can help the physically handicapped student avoid these pitfalls.

The counselor can also assist these students while they are in college. Special arrangements for living or transportation may be necessary. Students may need help on the stairs. At times, the classroom in which a course is taught must be changed so that it is more accessible. In order to use service elevators, special permission may be required. In many other ways, counselors can help to make the handicapped student's program easier.

Frequently, counseling is needed regarding personality problems arising from or aggravated by the handicaps. In addition to the ordinary problems of adjustment to their environment, these students must adjust to severe disabilities which will alter their entire lives. Plans for careers, social relationships, marriage, financial security, or dependence are all influenced by the disability. The student's reaction to this stress is important in determining whether or not he will be able to handle his college course. For example, consider the girl with traumatic paraplegia. She is a person with considerable maturity and strength of character. Her Minnesota Multiphasic Personality Inventory profile shows that even with these assets she shows the increases in the first 3 scales consistent with the depression caused by her severe disability. Scale 7 also demonstrates concern of being unable to care for herself. Actually, this girl has made a particularly good adjustment because she is responsible and able. She will go to school, and we are confident that her performance in school and later at work will be very satisfactory.

But what of the young man who is also a paraplegic and whose multiphasic profile shows him to be a belligerent, rebellious, asocial, irresponsible person who denies the presence of unusual trouble in his family or in his social adjustment? His home situation is unsatisfactory. He is in open conflict with his stepfather and has nobody to counsel him in whom he has confidence. His community background is one of juvenile delinquency. A number of his friends have been sent to reform school and, in his opinion, they have demonstrated their individuality in the face of the law. He also has some assets. He has an I.Q. of 130. He has considerable artistic talent which has not yet been trained.

In the hospital, his attitude gradually changed from belligerent negativism to acquiescence to occasional active interest. He had never been trained to maintain any persistent effort and, consequently, lost interest if his goals were too distant. He could not be relied upon to maintain any activity over a prolonged period of time without supervision and support. His perform-

ance in rehabilitation and in the hospital school was good. He learned to walk easily with crutches. He could handle his high school lessons. But, when he returned home to continue in public school, he could not be relied upon to care for himself enough to prevent decubiti from developing or to make the effort to get up and go to school. Constant supervision and encouragement have been necessary.

This boy has the aptitude and ability for engineering if his energies are properly channeled and controlled. For this student, it is essential that a rehabilitation counselor work with him, support him, and keep him actively following his study program. In many ways, this counselor must substitute for the father whom this boy never really had. Under these circumstances, I think that he will go through engineering and become completely independent. The path will not be smooth, and many potential pitfalls lie in the way. On the other hand, to deprive him of this chance virtually sentences him to a dependency associated with increasing unhappiness, maladjustment, and disability. We think the only alternative for a person of this type is complete rehabilitation.

Remarkably good rehabilitation is achieved in some cases. One young man was taken out of

line with a fever of 102° F. as he appeared for his entrance physical examination. He developed acute anterior poliomyelitis involving trunk and all four extremities. He was hospitalized for about four months, treated as an outpatient for another two months, and then returned to school walking with two Kenny sticks. He still returned for therapy several days each week for three months. Eventually, he could walk well without sticks. He is completing his schooling now. He still limps and considerable weakness is present in all extremities, but he manages very well.

To us these physically handicapped young people present a challenge. Without an education, they cannot hope to compete with their physically normal associates. With a suitable education, they are no longer vocationally handicapped. In order to educate these young people, living and school facilities must be provided which they can handle. As physicians and health personnel, we are the best trained to recognize their assets and to adapt facilities so that these assets can be utilized. From us must come the leadership and a means of providing a college education for these young people with physical handicaps who have the ability and the will to complete a college training program and to enter a profession.

TRIGGER FINGER is notable by a snap or jerk when the finger passes a certain degree of flexion or extension. The condition is caused by constriction of a part of a tendon sheath at the level of the head of the metacarpus. Thomas E. Hodgins, M.D., and Paul R. Lipscomb, M.D., of the Mayo Clinic and Foundation, Rochester, Minnesota, find that the finger may lock in flexion when the discrepancy between the size of the lumen of the sheath and the size of the tendon is too large. In a 1-year-old child who had had bilateral flexion deformities since the age of 5 months, normal function was restored by excising segments of tendon sheath. The excised specimens showed fibrous tenosynovitis.

THOMAS E. HODGINS, M.D., and PAUL R. LIPSCOMB, M.D.: *Proc. Staff Meet., Mayo Clin.* 31: 279-281, 1956.

Football Injuries

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SINCE LOOKING BACKWARD is a pastime that engages most of the people some of the time, it must have some appeal. Therefore, the purpose of this article is to review the past ten years of football at Princeton University, with special emphasis on the doctor's records of injuries.

The team personnel listed many World War II veterans when the decade started in 1946. The squad age, therefore, was a little above the usual average for a few years. Also, the rules tended to liberalize substitutions until whole teams especially trained in offense or defense were substituted with each change of the ball. This practice flourished through 1952 when the rules committee banished two-platoon football in order to improve the game and relieve the pressure on colleges lacking the financial backing to support dual teams. An important regional change in 1951 interfered with calculating the effect of this major change on injuries at Princeton. The presidents of the 8 schools in the Ivy League abolished all spring practice after 1951. The 2 edicts mutually disrupted each other's grounds for satisfactory comparison.

There were two major constants during the period of this report. First, the coaching staff remained intact so that techniques were essentially the same throughout. Second, Princeton stuck adamantly to the single wing style, while most colleges were changing to the rejuvenated "T" formation which went out years before.

Each season started with a three-week conditioning period when double practices were held daily. This was followed by a 9-game schedule, except during the first three years when there were 8. During the ten years, the varsity participated in 289 preseason conditioning sessions, 447 daily practices, and 87 games. The junior varsity proportions were similar, but smaller. Of interest is the fact that 45 per cent of the injuries in the decade occurred during the preseason periods which occupied 35 per cent of the practices. This heavy incidence was due to the varying physical conditions of the players

upon return, different states of development in technique, fatigue and stiffness attendant to the daily double practices, and inadequate rest between sessions for minor bruises. Games accounted for 24 per cent of injuries, leaving 31 per cent for the daily sessions during game weeks.

The composite squad for varsity and junior varsity football was 975 students with yearly units varying from 72 to 118. Injuries to 622 were severe enough to cost them at least one day of practice, with the exception of 6 who had teeth injuries but lost no time. These figures show that 64 in each 100 players were hurt. Furthermore, 911 injuries occurred in the ten years, which means that once injured, a player stood a 46 per cent chance of being injured again. This was not the case, however, because some students were more prone to mishaps. The highest number of casualties to 1 man in a season was 5, and this happened 3 times. In three years, 1 player was injured 12 times and another, 10 times. However, these figures are contrasted in a player like All-American Kazmaier who saw plenty of action in games and even more in weekly practice sessions. He sustained only 3 injuries and lost a total of nine days during his three years of play. He was far from ruggedly built, but he had a great knack for carrying out his task to the last fraction of a second before being hit and then falling with the blow.

The great majority of the 911 injuries were minor, resulting in quick and total recovery. However, 8 were advised to discontinue the sport permanently, and 35 for the balance of the season. Among the 8 injuries were a dislocated hip, a lateral dislocation of the knee, 2 low-back sprains, and 4 concussions with previous histories. The hip and knee dislocations happened in 1946 and both progressed very satisfactorily after long convalescent periods. There was no evidence of absorption five years after the hip injury. Included in the larger group who dropped out for the season were 11 sprained knees, 4 contused kidneys, 4 dislocated shoulders, 6 fractures, 3 myositis ossificans, 3 concussions, 2 sprained necks, 1 low-back sprain, 1 cervical

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neuritis due to a cervical rib, and a bad laceration. All were able to play again in later years either through complete recovery, surgical interference, or special braces. Excluding these 43 players and the 6 with teeth injuries, a total of 5,238 practice days were lost because of other injuries, which amounts to an average of 6.1 days per case.

Sprains occurred most frequently, numbering 379. As might be expected, knee and ankle injuries each exceeded all the other joints combined with 155 and 120, respectively. Operations were performed on 12 knees. The anterior cruciate ligament alone was involved in 3 instances, the medial meniscus alone in 5, and both in 3. The twelfth case turned out to be osteochondromatosis and the part injury played is not known. The average period of recovery for a player with a disabled knee, excluding those dropped for the season, was 9.2 days. No players with injured ankles discontinued the game, and the severity rate was 6.3 days per sprain. The acromioclavicular joint suffered 33 times and averaged 9.1 days each. The remaining 71 accidents involved the back 17 times, neck 15, foot 14, elbow 8, costochondral 8, hand and wrist 7, and the sternoclavicular, 2.

Contusions were second to sprains with a total of 274, involving practically every part of the body. The most common site was the thigh with 72 contusions, 4 of which resulted in ossification. Of these, 32 occurred in the first two years when protective equipment was inferior due to a shortage of good material after the war. Contusion of the iliac crest is very painful and disabling for about five days, and it happened 57 times during the decade. In 1956, a hip pad made of "absorblo" rubber was used, and for the first time in the decade, no hip bruises occurred. The kidney was contused in 3 players in 1946, in 1 in 1953, and in 1 in 1956. Of these, 4 were advised to stop playing for the season, and 1 was kept out of practice for eleven days. The average time lost for contusions in general was four days apiece.

During the ten years, 58 concussions occurred. Of the players with these injuries, 4 were advised to discontinue all contact sports permanently, because of past histories of repeated head injuries. Symptoms were prolonged in 2 others and, rather than risk recurrence the same year, they were advised to stop playing for the season. The other 52 concussions were mild and cleared completely within a few hours. All patients were withheld from contact sports for a minimum of three days. There was no instance of recurrence in these 52 cases.

Bones were fractured 51 times and 8 teeth were injured. The extremities suffered 20 breaks: thumbs 4, fingers 4, fibulas 3, scaphoid carpals 2, radii 2, and cotton 1. The torso had 12 breaks, 8 of which were to transverse processes in the lumbar region. Also, 3 ribs were broken and 1 clavicle. Of 19 fractures to facial bones, 11 were to the nose, 2 to the mandible, 2 to the maxilla, and 1 to the zygoma.

There were 16 dislocations. In 11, the humerus was displaced anteriorly. One player dislocated his left shoulder as a freshman and again in his sophomore year with the varsity. A capsular repair was performed and he got along well until his senior year when he dislocated the other shoulder. One of the 3 finger mishaps was compound.

The remaining 125 cases fell into various categories: 79 muscle strains, 25 lacerations, 10 traumatic bursitis, 7 blisters, 1 corneal abrasion, 1 avulsed nail, 1 tenosynovitis, and 1 traumatic neuritis.

The football player at Princeton University from 1946 through 1955 ran a 64 per cent chance of being injured, and, once injured, had a 46 per cent chance of being injured again. The risk was high, but fortunately, the probability of severe injury was much less, since it was only 4 per cent. Except for this 4 per cent, each injury caused the player to lose 6.1 days. The reward for taking these chances was his membership in a series of Princeton teams which enjoyed unparalleled success.

Impact: Re-examination of Its Meaning

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THE VARIOUS SPONSORS of health programs carried on in underdeveloped countries often judge a project by its "impact" value. This is true of FOA, WHO, UNICEF, and voluntary organizations operating such efforts either on a large or limited scale. A standard dictionary defines impact: "collision; the forcible contact of a moving body with another at rest." Indeed, the introduction of modern hygiene and medical science into a village holding century old customs, mores, and superstitions can have the dramatic flavor of physical collision.

However, from the professional point of view and as used in public health work, the word impact has other connotations. The term can apparently imply the following:

1. A program which in a short period of time can show results in lessened morbidity and mortality. In other words, a specific control giving rapid, sure, and obvious results. An example of this meaning is a yaws' program where case finding and treatment result in rapid healing and relief of the patient. Also foci of infection are removed with a resulting immediate fall in incidence and prevalence.

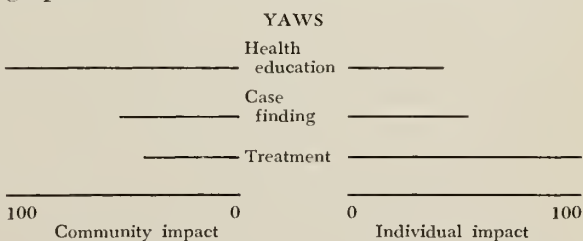
2. A program which is favorably and enthusiastically received by many people either because of increased comfort, personal identification, or because of real or imagined benefits which lie in the future. An example of this meaning is a trachoma control project in which a broad-spectrum antibiotic ophthalmic ointment is instilled into the eyes of affected persons. The immediate relief is welcome and the program has great popularity, but the professional public health worker recognizes that true control of the disease may never be achieved until great changes are effected in personal hygiene and environmental sanitation practices.

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Under both these interpretations, wide community acceptance is necessary in order that a program succeed in an impact sense. In fact, the use of the word grew out of the urgency to convince large groups of people that their governments with outside aid were doing something to help them. The variant between the definitions lies in the demonstrable scientific result. In other words, the primary emphasis of the second meaning is on social impact versus program completeness and long-range effectiveness of the first meaning.

It appears to us that another point of view might be utilized to better advantage in judging "impact" value. While justifying the word always on the basis of contribution to the ultimate real control of a disease or solution of a problem, the variant would rest in whether the impact is of an *individual* or *community* nature.

Obviously, the ideal situation is a program in which all component parts have high impact on both the community and individual. To use yaws again as an example and make a graphic presentation, the various elements are plotted in the accompanying horizontal bar graph.

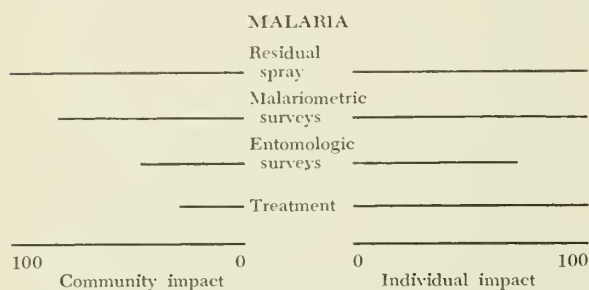


The length of the lines under "Community impact" indicates the *percentage* of the whole population reached in one way or another by the elements of the program. The lines under "Individual impact" indicate the intensity of effect upon a *given individual*.

As shown, all three elements have individual impact. Each also has a community impact of considerable force. The combined effect provides an ideal impact program because only a few elements are involved, each of which has impact value in every sense. Also, the total pro-

gram may be applied to a population with immediate results as well as excellent long-term results.

Malaria control may also be used to demonstrate great impact value and this explains why it is such a natural impact project.



The residual spraying involves an entire population. They participate both physically and visually; and, although they cannot see mosquitoes killed, they can see cockroaches, bed bugs, and other insect pests die. Good malariometric surveys also touch a great many people either through examination of the person or of a member of the family.

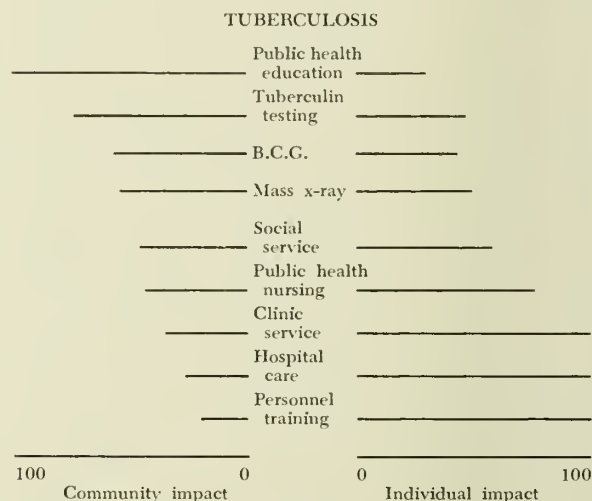
Here again is a program rapidly applicable and having a short-term "incubation period" between application and results. Individual as well as community impact is great.

Tuberculosis control will be used here to present the concept in terms of a detailed example. The various elements will be described in relation to their respective "impact" values. As this thesis is developed, an unexpected and very interesting pattern develops. Elements of the program which are high in individual impact tend to possess low community impact. Quite obviously, this is not a hard and fast pattern, and the reason for presenting it is not primarily an attempt to prove this inverse relationship. Rather, the objective is to show a somewhat different point of view in program evaluation which may be helpful in assessing effectiveness.

A complete tuberculosis control scheme should include many categories of activities, ranging from health education of the entire population to the treatment of an individual in an institution. Between these extremes are such matters as tuberculin testing, mass x-ray case finding, and all the other activities which are listed in the tuberculosis graph. Each of these can be roughly evaluated by the aforementioned double standard of impact value. See graph for illustration.

A visual aid as inexact as the tuberculosis graph must be defended by stating that it gives a general qualitative connotation and has no

exact quantitative intent. Other students of the subject may choose to lengthen or shorten the graph lines. There is also considerable overlap, such as clinic service and contact examinations, but without doubt public health education reaches the greatest number, and personnel training or residence in a hospital has the most intense individual effect. All parts of the program have importance, but varying emphasis is exerted by each upon the person and the crowd.



Public health education is a blanket technic. Its chief individual impact is to motivate individuals to present themselves when opportunity permits, or conditions suggest, to other parts of the control machinery and to promote understanding of why certain things must be done.

Tuberculin tests can reach a great number and impress particularly those with a positive reaction. Aside from the administrative and epidemiologic importance of knowing age-specific infection rates, the chief control value individually is again motivation to further action when necessary. Performed without an opportunity for such follow-up, as a mass procedure, it is of little value, which does not detract from its value as a diagnostic aid.

BCG immunization can be bracketed here with tuberculin, except that the "personal assault" aspect is slightly greater and that some individual immunizing action can be expected under given circumstances.

Mass x-ray technics, whether on a community, group, or hospital admission basis, enter an area of really effective individual impact. But, its application is limited to the community, because of its technical, time- and personnel-consuming aspects, as well as expense considerations. Hospital admission surveys affect fewer individuals; therefore, community impact is less. However,

the per-effort unit or yield is higher, since the percentage of positive individuals is greater.

Social service, still an insufficiently appreciated newcomer in tuberculosis control, exercises a subtle but strong influence on all of the more individual-motivating aspects of the campaign against tuberculosis. The assistance in solution of financial and adjustment problems, coincident with the occurrence of tuberculosis in the family, can exert a very real impact on such a family.

Home visiting by public health nurses, which enters the field of direct individual therapy and supervision of their immediate families, affects fewer individuals but again more intensely. The prophylactic influence of direct instruction in isolation procedures, cleanliness, and strong motivation toward further procedures of care, diagnosis, and rehabilitation is of great individual importance.

Dispensary and clinic care, with its additional technical aids, also witnesses entry of the physician and the physician-patient relationship into tuberculosis control. Contact examinations are largely a part of clinic activities as well as definitive diagnostic and therapeutic personalized service. The potential for individual impact on patient, contact, and family becomes intense as direct medical treatment comes into full play. Again, fewer persons are treated but with greater intensity.

Hospital care of patients offers top opportunity for arresting infection at the source by therapy and especially by complete isolation. All other aspects of tuberculosis control must be considered as leading by diagnosis, persuasion, and political action toward making possible a hospital bed for each discovered communicable patient and motivating such patients to remain in bed as long as necessary.

Finally, by the *technical training* of personnel, the rest of the program becomes possible. It affects the fewest individuals, but gives life-long direction to their careers. Through this source, the individual impact reaches possibly its maximum effect and upon the smallest number of individuals. The impact on the community, although not immediately apparent, should be considered in the light of the contribution each individual so trained may ultimately make.

In the administration of a reasonably complete tuberculosis control program, which includes all or most of the elements mentioned and is adequately financed and manned, choice between the parts is unnecessary. However, emphasis must still vary in order to accommodate the differing epidemiologic characteristics of the problem.

But, in areas where a tuberculosis control scheme is lacking or weak, as is the case in many countries in which FOA and WHO operate, a choice of procedures must be made. Because resources are limited, trained personnel are not numerous, and tuberculosis is prevalent, competing elements of the program make urgent claims. What part should be attempted first? Would the maximum effect be obtained by trying to reach many people in a small way, fewer people more intensely, or only a small group. In view of the wide variation of factors which impinge on the problem with varying force in each country, no comforting single formula can be used. Opportunism and desperation sometimes force the decision.

Can the elements be graded according to how much is received for the available money? For example, if enough is available for either a two-year BCG immunization campaign or for construction and maintenance for two years of one tuberculosis dispensary, which would be preferable? Each would require wide public acceptance to succeed. BCG would certainly reach and impress many more people. Approximately 25 persons can be tested and inoculated for the cost of servicing 1 clinic patient. Is this factor of sufficient value to adopt, or do other considerations make the simple monetary justification unsound?

Another dictionary definition of impact is "to drive close; fix firmly, pack, wedge." This would better fit the qualitative idea of more service or more intense service. Using the past participle, impacted, which is commonly used in dentistry, could we proceed so maladroitly as to wedge in one element so tightly that other beginnings are excluded and, ultimately, like its dental equivalent, requires surgical extraction before a healthy condition can be attained?

These metaphoric flights of fancy can easily be applied to situations in the United States. Witness the stubbornness with which tuberculin testing programs of primary school children, usually without follow-up were continued long after they had been replaced in most communities by more productive elements of control. Note cases in which beautiful sanatoriums absorbed most of the interest and money, without provision of proper diagnostic, clinic, follow-up, and home visiting services. The lesson is clear; even with limited resources, there should be some balance to a program. All attention and effort should not ordinarily be directed toward a single element. However, if the latter procedure is adopted as a first step, it should not be oversold to the extent that other elements of the program are blocked.

Another disturbing thought: are we reaching the ruling literate group of the recipient nation, and touching few, in the sense of acceptance, of the common men and women? When political impact directed toward the ruling class is primarily the aim, such stratification and selecting must especially be avoided. "This is something *they* want" is rarely sufficient justification for such a step as, for example, the erection of lavish operating room suites on the grounds of an almost totally inadequate hospital with too few doctors, too few nurses, and inadequate water supply and electric current.

SUMMARY

Usage of the term impact in public health programs is reviewed. Present interpretation is

loose and may refer to social, scientific, or propaganda achievement. Such use tends to cause unwarranted justification of projects and a failure to analyze program progress objectively. An alternate application of the term is proposed in which impact is analyzed on the basis of individual versus community values. Such a double definition can be used as an objective evaluation procedure. We propose the thesis that the old shibboleth "The government wants it and so it has impact value" is seldom sufficient reason for decision regarding disease-control programs, the construction of operating room suites, or the furnishing of modern equipment. Analysis of the problem, establishment of goals, definition of procedures, and sound evaluation still represent the only sure method for success.

LEFT ATRIAL THROMBOSIS is demonstrable by angiocardiographic examination.

With mitral stenosis, opacification of the left atrium after injection of dye is intense, homogeneous, and prolonged, allowing easy visualization of atrial masses. In a left lateral projection, the posterior wall of the left atrium, the origin of nearly all mural thrombi, is visible. Stereoscopic films are made to help differentiate extracardiac from intracardiac densities. More than 1 film is needed to determine the extent of the thrombus.

With mural thrombus, angiocardiograms show a filling defect and irregular margination of the posterior wall of the left atrium. A ball-valve thrombus is suggested by a filling defect which is smaller than a myxoma and which is not attached to the atrial wall.

If visualization of the left auricle is incomplete and irregular margination of the junction of the left auricle with the left atrium is observed, left auricular thrombosis is probable. Lack of opacification alone is not sufficient grounds for diagnosis. The auricle may be obscured by overlying pulmonary vessels in the anterior projection or by the atrium in the lateral view.

LOUIS A. SOLOFF, M.D., and JACOB ZATUCHNI, M.D.: *Circulation* 14:25-32, 1956.

A STUDY of the records of 8,183 autopsies reveals that the incidence of fatal myocardial infarction was 20 times as great in the decade 1945-1954 as in the period 1910-1919. Increase in incidence affected all adult age groups. During the forty-five year period, acute myocardial infarction was the cause of death of 500 patients.

Before 1940, proportion of males to females dying of infarction was 2:1; in the period 1940-1954, the corresponding ratio was 1.1:1.

Incidence of infarction in women rose steadily with age; in men, incidence was highest from 60 to 80 years of age and decreased thereafter.

Infarction occurred less frequently among Negroes than among white patients. Socioeconomic status did not influence incidence. Diabetes mellitus was apparently an important factor in development of atherosclerosis; the disease was 4 times as common among women and 3 times as common among men who died of infarction as among those dying of other causes.

KYU TAIK LEE, M.D., and WILBUR A. THOMAS, M.D.: *Arch. Int. Med.* 97:421-430, 1956.

The Journal Lancet

SERVING THE MEDICAL PROFESSION OF MINNESOTA,
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January 1956
through
December 1956

LANCET PUBLICATIONS, INCORPORATED
MINNEAPOLIS, MINNESOTA

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1. J. A. M. A. 159: 645 (Oct. 15) 1955.
2. J. A. M. A. 158: 386 (June 4) 1955.



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Androgens: Biochemistry, Physiology, and Clinical Significance, by RALPH I. DORFMAN, Ph.D., and REGINALD A. SHIPLEY, M.D., 1956. New York: John Wiley & Sons, Inc. 590 pages, illustrated. \$13.50.

Experimental biochemists, endocrinologists, and a limited number of urologists and internists will find this a most valuable source book about the androgens. The bibliography is extensive. The volume is divided into four parts, covering history, biochemistry, physiology, and clinical aspects of the androgen hormones.

Typographic design and organization are excellent, but style and proofreading are not so good. Nevertheless, typographic errors and cumbersome, occasionally confused style do not nullify the value of this rich mine of information and the book will long stand as the authoritative treatise on the subject of androgens.

EDWARD J. STIEGLITZ, M.D.

• *Metabolism, Pharmacology and Therapeutic Uses of Gold Compounds*, by WALTER D. BLOCK, Ph.D., and KORNELIUS VAN GOOR, M.D., 1956. Springfield, Illinois: Charles C Thomas. \$2.75.

BOOK REVIEWS

This monograph presents an excellent survey of the metabolic pharmacologic, and therapeutic uses of gold compounds. It should be especially interesting to those who have avoided using these compounds because of their toxicity. The mode of action of gold salts in therapy is not known, toxic reactions remain unpredictable, and a completely satisfactory means of treatment is lacking. Such limitations have lessened the zeal for this type of therapy which, according to the author, is now used only in the treatment of rheumatoid arthritis. However, even the use of gold salts in this condition may continue to be challenged because of toxicity and the many unanswered related problems.

C. A. MCKINLAY, M.D.

Roentgen Interpretation of Fractures and Dislocations, by JOSEPH LEVITIN, M.D., 1956. Springfield, Illinois: Charles C Thomas. 246 pages. \$7.75.

The stated purpose of this book is "for the roentgenologist and those general practitioners who treat fractures and dislocations." Since most roentgenologists do not consider themselves expert enough to offer advice in the treatment of fractures, this book's usefulness may be limited.

This small volume contains numerous excellent line drawings of fractures and dislocations. They are accompanied by brief descriptions of common fractures with an occasional word about treatment. In some instances, however, treatment is discussed in considerable detail. Some of the chapters, particularly those pertaining to the wrist, elbow, and ankle, are very well done and contain fine descriptive drawings and a good deal of succinct information. Other portions of the book, especially those dealing with the femur, pelvis, and spine, do not contain enough information to warrant their inclusion. A discussion on fractures of the neck of the femur is rather long and rambling.

(Continued on page 32A)



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BOOK REVIEWS

(Continued from page 30A)

Some very poor x-ray reproductions of certain problems are included. To me, the purpose of this chapter is something of a puzzle. However, the line drawings depicting various types of femoral neck fractures are excellent.

Some shadow outline drawings of various types of appliances are found in an appendix chapter, presumably designed to help the roentgenologist identify them. Some inaccuracies are noted, particularly the drawing of a Knowles pin.

This book is of some definite value for those treating fractures

and dislocations and it might help the general practitioner improve his roentgen interpretation. There is some good advice pertaining to treatment. The book is apparently not intended to take the place of standard texts on the treatment of fractures.

JOHN H. MOE, M.D.

American College Health Association News . . .

Dr. Randall Briggs, Denver, Colorado, has been named student health director at the New Mexico College of Agriculture and Mechanic Arts, State College, New Mexico.

P. S. Ambrose, dean of students, states that Dr. Briggs is new to the college health field but that he has indicated an interest in membership in the A.C.H.A. for New Mexico A. & M.

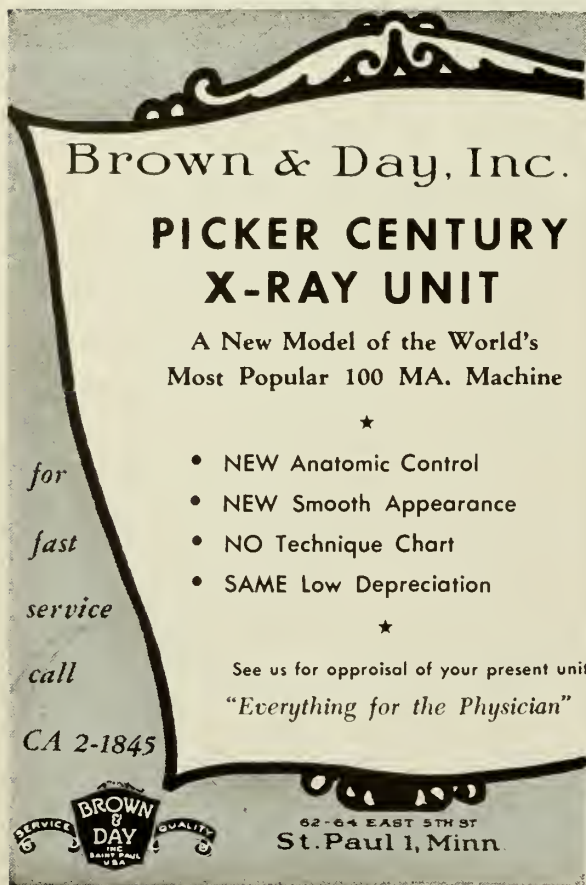
• • • •

Dr. Morley Beckett, director of the student health service at the University of Michigan in Ann Arbor has indicated an immediate need for staff physicians.

Anyone interested may obtain more information by writing to Dr. Beckett at the Health Service, University of Michigan, Ann Arbor, Michigan.

• • • •

Richard G. Bond, University of Minnesota, chairman of the Environmental Health and Safety Committee of the A.C.H.A. attended the meeting of the American Public Health Association in Atlantic City the week of November 12, where he met informally with other registrants who had particular interest in problems of environmental health and safety on college and university campuses.



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LOS ANGELES

News Briefs . . .

North Dakota

DR. F. R. ERENFELD, of the Erenfeld Clinic in Minot, was recently named an associate fellow in the American College of Gastroenterology.

DR. C. D. HAAGENSEN, a 1921 graduate of the University of North Dakota Medical School, is author of the book "Diseases of the Breast." A copy of the book has been received by the medical school. Dr. Haagensen is now professor of clinical surgery at Columbia University and director of surgery at the Farneis Delafield Hospital, Columbia-Presbyterian Medical Center, New York City.

DR. FREDERICK L. BEHLING, orthopedic surgeon on the staff of the Dakota Clinic in Fargo, presented a paper before a session of the American College of Surgeons in San Francisco in October. Research for the paper entitled "Concerning the effect of metal in treating fractures and growing bones" was done while Dr. Behling served a fellowship at the Mayo Clinic.

DR. RICHARD LEIGH, whose practice in Grand Forks in 1951 was interrupted by two years of service in the Navy, has returned to Grand Forks and is associated with the Leigh Clinic. Completing his training in obstetrics and gynecology at St. Luke's Hospital, Fargo, and the University of Minnesota, Dr. Leigh is limiting his practice to that specialty.

DR. JAMES LITTLE left Mayville November 1 for the Air Force Base at Montgomery, Alabama, where he will undergo an indoctrination course before being transferred to Syracuse, New York. Prior to his departure, Dr. and Mrs. Little were guests of honor at a farewell party given by physicians and personnel of the hospital.

DR. WILLIAM J. MCGEE, formerly of Alva, Kentucky, has established practice in Riverdale. He replaces Dr. Harold Phelps who is now located in Winner, South Dakota. Dr. McGee is a native of Troy, Pennsylvania, attended Notre Dame, and received his medical degree from St. Louis University.

Minnesota



DR. SPINK

WESLEY W. SPINK, M.D., professor of medicine at the University of Minnesota, is author of the new book "The Nature of Brucellosis." Published by the University of Minnesota Press, the book crystallizes twenty years of work with human brucellosis at the University of Minnesota and includes a comprehensive review of animal brucellosis. Dr. Spink is chairman of the National Research Council Committee on Brucellosis and is a member of the expert committee on World Health Organization and the Food and Agriculture Organization of the United Nations. He has lectured and participated in conferences on medical and public health problems in many European and South American countries.

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A MEDICAL CENTER in Israel is to be named in honor of two Minneapolis Zionist leaders, Dr. and Mrs. Moses Barron. A testimonial dinner was given for the Barrons November 11 at the Radisson Hotel by the Minneapolis Histadrut Committee which will undertake a two-year \$100,000 fund-raising campaign for the new project. The new consulting and diagnostic center will be constructed at Rishon Lezion and will provide medical services, x-ray, laboratory, medical supplies, and drugs for a population of 75,000.

* * * *

THE GOOD THUNDER MEDICAL CLINIC was officially opened early in November. Prior to the opening, the public was given an opportunity to visit the center, which is considered one of the finest of its type in the country.

* * * *

THE MAYO FOUNDATION may change a longstanding policy and accept government grants for medical research. Dr. Charles W. Mayo revealed the proposed change to the University of Minnesota regents during their recent meeting in Minneapolis.

* * * *

THE UNIVERSITY OF MINNESOTA recently received a \$7,000 grant from the Damon Runyon Fund for Cancer Research. A total of \$157,000 has now been given to the University hospitals by the fund.

* * * *

A MAYO CLINIC AND MAYO FOUNDATION scientific exhibit entitled "Ventricular Septal Defect" received the third-

place award at the international scientific assembly at the Interstate Postgraduate Medical Association of North America in Cleveland October 22-25. Authors of the exhibit are: Drs. Howard B. Burchell and Robert O. Brandenburg, sections of medicine; Dr. André Bruwer, section of diagnostic roentgenology; Dr. David E. Donald, assistant to the staff in surgical research; Dr. H. G. Harshbarger, fellow in surgery in the Mayo Foundation; Dr. James W. DuShane, section of pediatrics; Drs. Earl H. Wood and H. J. C. Swan, section of physiology; Dr. John W. Kirklin, head of a section of surgery; and Dr. Jesse E. Edwards, section of pathologic anatomy.

* * * *

DR. ELGAR V. ALLEN, senior consultant in medicine at the Mayo Clinic, was installed president of the American Heart Association at the organization's annual assembly meeting in St. Paul.

* * * *

DR. ARLIE R. BARNES, Mayo Clinic physician and professor of medicine in the Mayo Foundation, is the recent recipient of a Gold Heart award from the American Heart Association for "outstanding contributions to the fight against heart disease."

* * * *

DR. ARTHUR C. KERKHOF and DR. MAURICE VISSCHER of Minneapolis have been named to committee chairmanships of the Minnesota Heart Association for 1957. Dr. Kerkhof will serve on community service and Dr.

(Continued on page 36A)

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NEWS BRIEFS

(Continued from page 35A)

Visscher on research allocations. Announcement has been made that the 1956 heart fund goal of \$380,000 has been exceeded by 22 per cent.

• • • •

DR. WARREN A. BENNETT, a member of the Mayo Clinic staff since 1944, left Rochester November 1 to become director of laboratories of the Thomas D. Dee Hospital in Ogden, Utah. Dr. Bennett's particular interest has been in such studies as the effect of steroid compounds on tumors transplanted to mice and on the human pituitary body and adrenal glands, the effects of ultra high-frequency sound waves on tissues, effects of radioactive phosphorus upon certain diseases of the blood; and problems in pathologic anatomy likely to be encountered by coroners.

• • • •

DR. KEITH MOULTON, after two years of service in the Navy, has resumed practice in St. James with his partner, Dr. R. A. Parsons. Both physicians established practice in St. James in 1954, but Dr. Moulton was called into military duty only three months later.

• • • •

DR. MAURICE R. MCNEIL has joined Dr. Arthur Neumaier in the practice of medicine at Glencoe. Dr. McNeil recently completed a two-year residency in surgery at the Detroit Memorial Hospital, Detroit, Michigan.

• • • •

MORE THAN 300 persons gathered at the Stephen school auditorium to bid farewell to Dr. E. O. Nimlos who had served the community for thirty-two years. During his years as Stephen's only physician, Dr. Nimlos delivered 1,401 babies. He will re-establish his practice in St. Paul.

South Dakota

THE OLD FORT PIERRE HOSPITAL building, which has served as an apartment house for about thirty years, has been purchased by Dr. E. P. Voss. It is now known as the E. P. Voss Clinic and extensive remodeling plans are contemplated. At present, the clinic occupies the entire first floor and part of the second.

• • • •

DR. RONALD PRICE and DR. MARY PRICE opened their new clinic in Armour early in October. The physicians purchased the McFarland Motor Company building and converted it into a modern clinic with 32 rooms, including a large reception room, library, offices for both doctors, and an x-ray room.

• • • •

DR. JOHN W. DONAHOE of Sioux Falls has been chosen to represent the South Dakota Heart Association for a three-year term as a member of the National Board of Directors of the American Heart Association. Dr. Donahoe is a past-president of the state association and has served on its board of directors for the past four years.

• • • •

DR. F. DANIELS GILLIS, noted Mitchell physician and surgeon who died May 30, was honored by the Mitchell City Council October 15 for his service to the city over a

(Continued on page 38A)

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Atropine Sulfate.....0.0582 mg.
Hyoscine Hydrobromide.....0.0195 mg.
Phenobarbital (¼ gr.).....48.6 mg.

Donnagesic No. 2 (red)

CODEINE Phosphate (1½ gr.).....97.2 mg.
Hyoscyamine Sulfate.....0.3111 mg.
Atropine Sulfate.....0.0582 mg.
Hyoscine Hydrobromide.....0.0195 mg.
Phenobarbital (¾ gr.).....48.6 mg.

1. Goodman, L. S., and Gilman, A.: The Pharmacologic Basis of Therapeutics, N. Y., The Macmillan Co., 1955; p. 127.

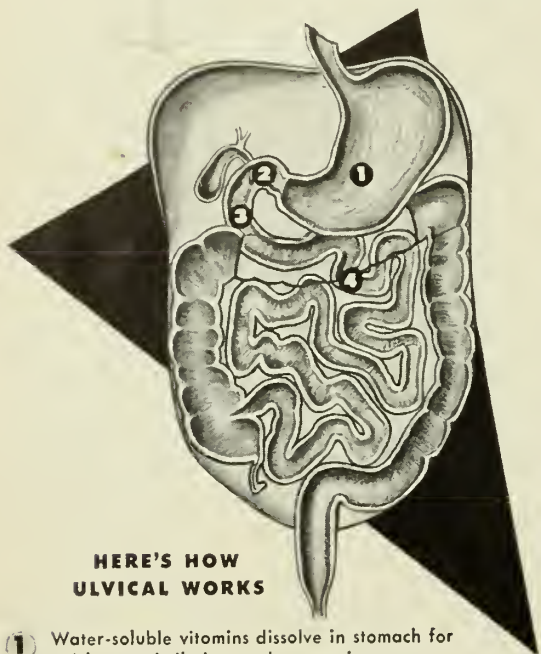
Robins

A. H. ROBINS CO., INC.
RICHMOND 20, VIRGINIA
Ethical Pharmaceuticals of Merit Since 1878

**HERE'S
HOW THIS**

prenatal nutritional supplement

**is more completely assimilated
... more easily tolerated**



HERE'S HOW ULVICAL WORKS

- ① Water-soluble vitamins dissolve in stomach for quickest assimilation and conversion.
- ② Enteric coating over compound vitamins and minerals does not dissolve at gastric pH. These pass into duodenum intact.
- ③ Enteric coating dissolves at duodenal pH, releasing calcium, phosphorus and iron. Iron available in the duodenum is more effective than that carried to the jejunum.
- ④ Enteric coating over oil-soluble vitamins and vitamin B₂ dissolves in the jejunum at pH⁺. Common nausea is thus prevented.

Equally effective in geriatrics.

Ulvical

(ULMER)

EACH TABLET CONTAINS	
Vitamin A	1500 units
Vitamin D	200 units
Thiamine mononitrate	1 mg.
Riboflavin	2 mg.
Ascorbic acid	16.66 mg.
Alpha tocopherol	2 mg.
(from mixed tocopherols)	
Calcium	
pyrophosphate	480 mg.
	(7½ gr.)
	(calcium 150 mg.)
Ferrous sulphate, USP	
(Fe 38 mg.)	192 mg.
	(3 gr.)

**ULMER
PHARMACAL COMPANY**
Minneapolis 3, Minnesota

NEWS NOTES

(Continued from page 36A)

long period of years. Dr. Gillis had practiced medicine in Mitchell for forty-three years and was president of the South Dakota State Medical Association at the time of his death.

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DR. EDWARD JOYCE of Hurley was honored October 21 at an open house at the Hurley school auditorium for his fifty years of active community service both as a physician and civic-minded citizen.

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DR. HURA, formerly of Eagle Butte, is now located in Howard. He replaces Dr. Shaw who left recently for Texas. Assigned to the Eagle Butte territory by the government, Dr. Hura received his release in November.

• • • •

DR. ALBERTAS REPSYS, formerly of Buffalo, is now practicing in Woonsocket at the Whiting Memorial Clinic. Dr. Repsys, a native of Lithuania, practiced in Germany for four years during and after World War II and served as medical director of a Lithuanian hospital before coming to America in 1951.

Deaths . . .

DR. FRANK I. DARROW, 64, Fargo physician and surgeon and a leader in North Dakota medical circles, died October 27. Dr. Darrow practiced in Fargo more than thirty years and helped found the present Dakota Clinic in 1926.

• • • •

DR. HARRY J. FORTIN, 66, one of North Dakota's best-known orthopedists, died October 19 in Fargo where, except for a few years with the Mayo Clinic, he had practiced since concluding his medical education. Dr. Fortin has aided countless children through the Elks Crippled Children's Foundation, the State Welfare Board, and through his private practice.

• • • •

DR. H. BRIGHT DORNBLASER, former Minneapolis obstetrician, died October 29. Dr. Dornblaser practiced in Minneapolis thirty-five years before retiring two years ago.

• • • •

DR. LYMAN R. CRITCHFIELD, 70, St. Paul pediatrician, died October 31. Dr. Critchfield was a former associate professor of pediatrics at the University of Minnesota and a member of the board of directors of the Minnesota Tuberculosis and Health Association.

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DR. CARL EDWIN ANDERSON, 63, a staff physician at the Moos Lake State Hospital, Minnesota, died of a heart attack October 22 while on duty at the hospital.

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DR. FRANK NAEGLI, 82, a physician who had practiced in Fergus Falls, Minnesota, for forty-five years, died October 22. The medical staff, employees, and board of directors of the Lake Region Clinic at Fergus Falls have established a memorial fund in memory of Dr. Naegli.

(Continued on page 40A)



